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Personality and Individuality Count in Professions—Let the Public Know You Believe in Pharmacy by Participating in Its Activities and Sharing in Its Promotions—Pharmaceutical Interest Centers in Rapid City This Month.

Vol. XVIII, No. 8 AUGUST, 1929

JOURNAL

AUG 19 1929

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION

TRADE MARK

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THE 77th ANNUAL MEETING WILL BE HELD AT RAPID CITY (BLACK HILLS), SOUTH DAKOTA, DURING WEEK OF AUGUST 26, 1929.

F. W. Brown, Lead, So. Dak., Local Secretary.

The 1929 Meetings of the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, Conferences of Pharmaceutical Association Secretaries will also be held at Rapid City, same time and place.

For Association Roster and Roster of the Boards of Pharmacy, of Officers of Pharmaceutical Associations, Local Branches, see pages x, xii, xiv, etc.

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A. Ph. A. HEADQUARTERS HOTEL PRESENTS MANY ATTRACTIVE FEATURES.*

BY BERT F. BELL.

The headquarters for the Seventy-Seventh Annual Convention of the A. Ph. A. meeting to be held in Rapid City, South Dakota, August 26th–31st, will be the new Alex Johnson Hotel. It is a typical Black Hills structure of nine stories, blended American terra cotta, rose-brown, russet brick, with a rustic upper portion, and presents an imposing and attractive picture. A huge rock fireplace and balcony in the lobby afford an atmosphere of real Western hospitality, and the glory and romance of pioneer days are brought to mind through the modernistic furnishings and Indian decorations.

The Grand Ball Room and Banquet Room, resembling somewhat the old baronial hall, presents novel and interesting features with its log-beamed ceiling and floor of golden cobweb design. The guest rooms are exquisitely furnished and spacious, comfortable and convenient.

At the extreme top of the hotel is found the Solarium and Observatory, decorated in beautiful modernistic designs; the sun parlor is fitted with specially made ultra-violet ray glass and will be a popular rendezvous. The peak of the hotel with its sun room affords a wide view of the Gateway to the Black Hills. From its glass walls objects for miles to the east and north may be seen. The range of mountains commence to cut in on the southern horizon, completely blotting it out on the west.

The cool and pleasant simplicity of the dining room is a restful contrast to the colorful modernistic and Indian decorations of the Indian Grill Coffee Shop. The walls of the hotel are adorned with pictures of prominent Indian chiefs of the Western tribes, much to the delight of the Indians who claim the hotel as their Tepee Tanke (Big Tepee). Big Chief, a direct descendant of Sitting Bull, acts as doorman and he is delightful and interesting to the tourists.

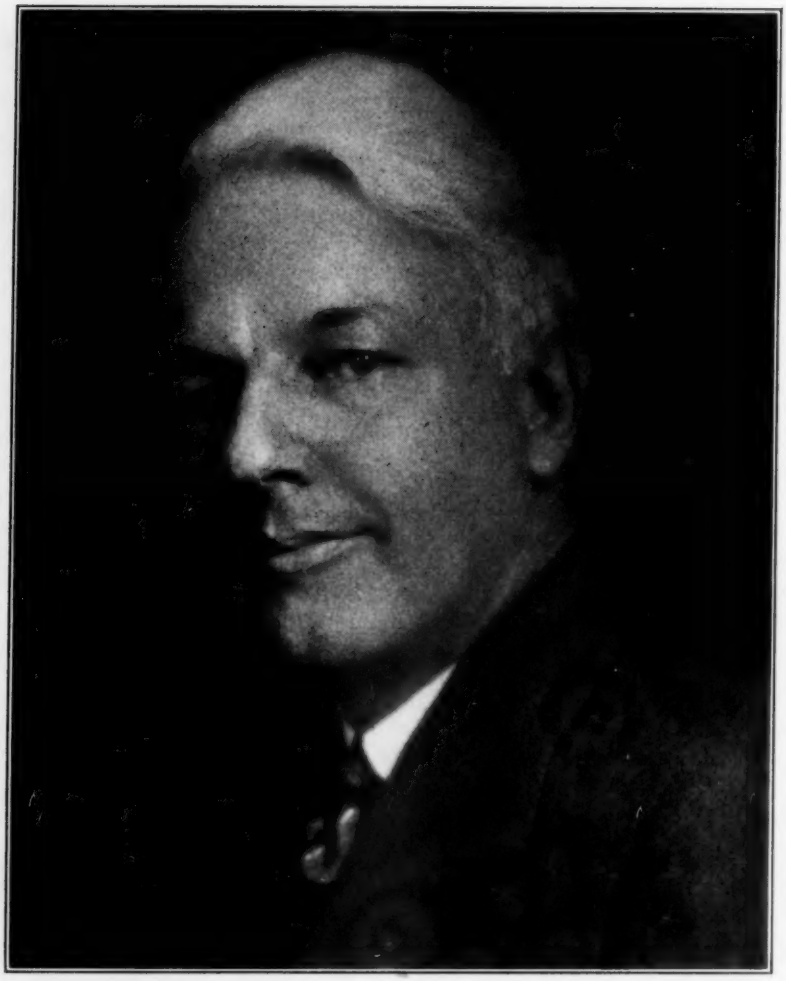
A boast of the Alex Johnson hotel management is its own orchestra. The one million dollar structure is owned and controlled by local men, and named in honor of Alex Johnson, formerly vice-president of the Chicago and Northwestern Railway who was an early pioneer in South Dakota. It is easy to radiate from the hotel to all points in the Hills. It has in connection, up-to-date transportation coaches for sightseeing, also saddle horses and stage coaches for side trips over the numerous winding mountain trails.

The hotel is heated by natural gas, piped from the gas fields of Montana, a distance of 175 miles. It is powered by local power and has its own ice plant, and water from pure mountain springs.

On the ground floor will be found the latest and most up-to-the-minute shops and offices. Doherty's, one of the state's most beautiful drug stores, opens into the lobby.

One of the unique rooms of the hotel is the Solarium with its display of mineral, agricultural and industrial products, also interesting specimens of fossilized fish and animals and other articles found in the Black Hills. The Black Hills are in reality mountains, with deep canyons, heavy pine and spruce timber, and fast-running mountain streams, and give an ideal setting for the headquarters of the Seventy-Seventh Annual Convention of the American Pharmaceutical Association.

* From Publicity Bulletin No. 11, by George A Bender, Chairman.



H. SHERIDAN BAKETEL.

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. XVIII AUGUST, 1929 No. 8

H. SHERIDAN BAKETEL.

Dr. H. Sheridan Baketel, newly elected president of the American Pharmaceutical Manufacturers' Association, was born November 15, 1872, at Hopedale, Ohio, the eldest son of Rev. Oliver Sherman Baketel, D.D., Editor of the "Methodist Year Book." He was educated at Phillips Exeter Academy, and Dartmouth College, receiving the degree of M.D., in 1895.

Dr. Baketel has been professor of Preventive Medicine and Hygiene at the College of Medicine of the Long Island College Hospital since 1915; he was one of the founders of *Medical Economics* and has been its editor since 1923.

He is a Fellow of the American College of Physicians, member of the American Medical Association, the American Public Health Association, the New York Academy of Medicine, the American Medical Editors' Association (President in 1920), member of the American Drug Manufacturers' Association, the American Urological Association, the American Association of Military Surgeons, and the State Medical Societies of New Hampshire, New York and New Jersey, and many other medical and scientific societies. He has been President of Reed and Carnrick, Jersey City, since 1926.

President Baketel was commissioned a First Lieutenant in the Army, in 1912, and has been a Colonel in the Medical Reserve Corps, U. S. Army, since 1924. He saw thirty-three months of active service during the World War, and is now in command of the United States Army General Hospital No. 79. Included among his fraternal organizations are the Alpha Kappa Kappa Medical fraternity, which he founded in 1895; Beta Theta Pi, of which he is a former Vice-President, and Theta Nu Epsilon. His club affiliations include the Crescent Club, Brooklyn; Dartmouth, Beta Theta Pi, Town Hall and Fraternity, New York; Yountakah Country, Nutley, N. J.; Kishawanna Country of Brewster, N. Y.; the Army and Navy, Washington; and St. Vincent's Association, London. He has long been a vestryman of St. James Episcopal Church, Brooklyn.

Dr. Baketel married Corinne Phillippe Sellers of Philadelphia. He has one son, H. Sheridan Baketel, Jr. (Dartmouth '20), of New York.

EDITORIAL

E. G. EBERLE, EDITOR 10 West Chase St., BALTIMORE, MD.

THE HELPFULNESS AND COÖPERATIVE SPIRIT OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

SINCE its organization the AMERICAN PHARMACEUTICAL ASSOCIATION has given recognition to pharmacists of other countries by election to honorary membership of individual members of a number of organizations. Those who have been thus honored have—during the year of their election, or in a succeeding year—contributed to the program of the ASSOCIATION. The purpose is not only to confer honorary membership to the individual, but to exemplify the professional spirit and invite fraternal relationship of the organizations represented by the individuals. All of those in the list of honorary members have rendered distinguished services for pharmacy, particularly in their own countries.

Canada and Cuba are near to us and the annual meetings are not infrequently attended by pharmacists of these countries, and it is pleasing to note the growing interest in Mexico. A number of Canadian pharmacists attended the Pharmaceutical Association of the State of Washington, at its recent meeting; former President Charles W. Johnson attended the meeting of the Canadian Pharmaceutical Association and quite a number of Canadian pharmacists will attend the meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION in Rapid City. Visiting pharmacists are always welcome and it is pleasing to have representatives from our near relatives in Hawaii, the Philippines and Porto Rico. Many of the problems of the pharmacists of the countries mentioned are ours also; some of them have come into closer relationship by the adoption of the U. S. Pharmacopœia and National Formulary as legal standards. As a matter of fact service counts in professions more than language or nationality; all are working for better pharmacy in the interest of humanity, and the A. PH. A. Headquarters will strengthen the bonds.

The House of Delegates brings together delegates of national and state associations and will become a continuously growing influence according to the use the associations make of the opportunities offered by the delegate body. There are many related problems which can be discussed during the meeting and proper action thereon taken for the advancement of pharmacy. Everything that promotes the service of pharmacy benefits those served, and in that relation all of the divisions of pharmacy.

Contemplated necessary legislation can be discussed and thereby viewpoints of the members of all organizations represented receive consideration. In that connection conclusions relative to the worthiness of support may be formulated for united action. Concerted action is essential for success.

There are regulations in the enforcement of laws applying to pharmacy which may seriously and disadvantageously affect all of its divisions and, incidentally, the public. Many will agree that certain advertising promoted for a period of years should never have been permitted, and that to which reference is made, apparently had as its chief aim the increase of tobacco users in the form of cigarettes. The fact that some of this advertising is being modified or discontinued testifies that

it should not have been used. It is almost surprising that legislation relating thereto was not proposed earlier, but it may be questioned whether this should be embodied in food and drug legislation. It may become a stepping-stone for extremists who do not give sufficient thought to the injury that may be done to legitimate industries; harmful activities are not entitled to support, but by every possible means the industries on which the prosperity of our country depends should be supported to the greatest extent possible; the problems of many of them are sufficiently difficult, without adding to their troubles.

These comments are made as a suggestion for possiblities worthy of thoughtful consideration in the House of Delegates. There are, of course, other questions; on some, action was taken at last year's meeting and work thereon is under way. There are questions arising from the methods of combines; perhaps these, as well as the individuals, may see leads to betterment of conditions or recognize possibilities of dangers that beset the paths.

The secretaries of pharmaceutical organizations recognized the opportunities and benefits to be derived by holding an annual conference during the meeting week of the AMERICAN PHARMACEUTICAL ASSOCIATION.

During the 1928 meeting of the A. PH. A. Deputy Food and Drug Commissioner Robert L. Swain, who also is Secretary of the Maryland Board of Pharmacy and Vice-Chairman of the House of Delegates, A. PH. A., read a paper before the section on Education and Legislation entitled, "Fundamental Factors in the Application of Pharmacy Laws," published in the JOUR. A. PH. A. for September 1928, page 858. Following the submission and discussion of the paper the Section adopted a resolution "to establish a Department of Legal and Legislative Reference as soon as practicable and arrange for a conference of enforcement officials at the earliest convenient date." The conference will be held in Rapid City at Alex Johnson Hotel, at 8.00 P.M. August 26th.

Law enforcement has taken on added importance during the year through the appointment of a national commission to study the question in all of its phases, and pharmacists should give serious consideration to the subject in the interest of the public and of pharmacy. Discussion and interchange of views and experiences will, doubtless, prove helpful.

Further comment would make this article too lengthy; the suggestions will enable the members to read between the lines and thereby gain a better understanding of the service rendered by the AMERICAN PHARMACEUTICAL ASSOCIATION—how it keeps pharmacists of other countries in touch with American pharmacists; how it endeavors to strengthen the bonds of State and National associations by bringing them together in the House of Delegates and otherwise coöperating with them, so that all divisions of the pharmaceutical activities may have favorable opportunities for discussing and solving problems of common interest, and all for the progress and service of pharmacy.

PROGRESSIVE KNOWLEDGE OF DRUGS.

THE renaissance of drugs implies a progressive knowledge of drugs; there are few, if any, relative to which our knowledge is complete. Probably the thought which gained sway that everything of importance relating to certain drugs was

known brought about some disuse or misuse, and thus for a time medical men were deprived of these means for treating the sick. Plant and animal life reveal their secrets gradually or, perhaps, it is better to say it takes many stages of study to acquire a complete understanding of the functions and products of life; the researcher may follow his lead to an end but this does not comprehend everything that is to be studied. One investigation uncovers the opportunities for many other studies, as shown by the researches of all periods.

Quoting Wilber L. Scoville, "Until quite recently we were inclined to think that unless a drug contained an alkaloid, a glucoside, a tannin or an active resinous principle and had a direction action upon some organ of the body, it could not be of much value as a medicine. But the recent studies on enzymes, vitamins and endocrine glands have shown us that while the chemical composition of vegetable or animal substances may be obscure and their mode of action not clear, yet their influence may be of great importance. We do not know what an enzyme is chemically, nor a vitamin, nor the character of most of the endocrine principles, yet the most recent medical and pharmaceutical interests have centered around the action of these indefinite bodies. We now realize that even minute traces of chemical bodies of unknown composition may exert a profound influence upon life processes. This has led to a new study of drugs, both new and old. Some of the older drugs, which would not down, but persistently ignored the dictum of the scientific authorities, are receiving new attention."

Other points were ably discussed by the same speaker dealing with the question of extraction, stabilization and standardization of drugs and preparations, all of which have a bearing on the disuse of some of the older drugs and their renaissance.

Dr. Linn J. Boyd, in addressing the American Pharmaceutical Manufacturers' Association, stated, in substance, that in his opinion the medical profession must apologize for dropping botanicals in the belief that only substances of a protein nature could produce an anti-body condition; also for the acceptance of laboratory results without giving full consideration to those of the bedside, for they are frequently different, due to the fact that laboratory reports are based on experimentation with healthy subjects.

As a matter of fact, while the number of drugs prescribed may have become less, the use of these agents has continued; it is up to us to be progressive in a better understanding of them—there is much to be learned relative to their culture and preservation and still more from further studies of extraction, stabilization and standardization. The value of hydrogen-ion concentration has been proven, and while the importance may be over-estimated and may lead some to draw conclusions that are beyond reason, the interest of the enthusiast and the conservative will result in adjustments whereby application of the method will be established and made serviceable. Scoville suggests that catalysts as used in other lines may lead to an application of the principles of their action in the preparation of pharmaceuticals.

The foregoing suggestions indicate a broadening field of pharmaceutical research which will lead the workers into different investigations, all of which may have a bearing on the finished products. The discussion of these subjects is stimulated because of the approaching revision of the standards. The coöperation of the labo-

ratorian, manufacturer, clinician, physician and pharmacist assures progress in drug knowledge.

Incidentally, we mention here that the hospital pharmacist should have a larger part in the progress of medicine, and to that end the importance of pharmacy in hospitals and hospital service should receive relative consideration in the interest of the public.

THE U. S. P. EXHIBIT AT THE ANNUAL MEETING OF THE AMERICAN MEDICAL ASSOCIATION.

IT IS pleasing to note that the American Medical Association has again awarded a special certificate for the U. S. P. Exhibit. The committee in charge of the exhibit at the Portland A. M. A. meeting was composed of: Dean C. W. Johnson, University of Washington, Seattle; F. C. Felter, of the *Pacific Drug Review;* Blumauer & Frank Drug Company, Portland, Ore.; President Frank Nau, of the Portland Retail Druggists' Association; Secretary Frank Ward, of the Oregon State Board of Pharmacy; Prof. E. J. Stuhr, Oregon State College, Ore. and Dean A. C. Mickelsen, of North Pacific College, Portland, Ore.

Aside from a complete set of U. S. Pharmacopœias the exhibit included a number of drug plants, products and preparations, official in U. S. P. X. Among the plants shown are: **Cascara Sagrada,** its extract, fluidextract and aromatic fluidextract; **Digitalis,** the infusion and tincture; **Belladonna,** tincture, fluidextracts, extract, plaster, ointment, atropine; **Peppermint,** water, spirit, oil and menthol; **Hydrastis,** the fluidextract; **Uva Ursi,** the fluidextract; **Veratrum Viride,** the tincture; **Rose,** the honey, water, fluidextract, the ointment.

THE GEOLOGICAL MUSEUM OF THE SOUTH DAKOTA SCHOOL OF MINES.*

BY DR. C. C. O'HARRA, PRESIDENT.

The magnificent splendor and colossal scope of Nature's creative artistry, so profoundly expressed in the everlasting monuments known as the Black Hills of South Dakota, will provide no small measure of interest for the assemblage of pharmacists who will attend the Seventy-Seventh Annual Convention of the AMERICAN PHARMACEUTICAL ASSOCIATION in Rapid City.

The Geological Museum, from the beginning, has been an important feature of the South Dakota State School of Mines. The collection of materials, now grown into a most worthy representation of the natural phenomena of western South Dakota, is one of the attractions which every visitor to this remarkably beautiful and rapidly developing Black Hills country endeavors to see.

The museum is not merely a collection of curiosities. It is made up of displays judiciously selected, carefully arranged and worthily displayed. Everything shown has a definite and permanent value. Some are noteworthy because of their beauty, some because of their economic and industrial interest, some because of their rarity and others because of their portrayal of life and conditions that long

* Parts of Publicity Bulletin No. 15, George A. Bender, Chairman.

ago receded into the bygone ages of the earth. There are exquisite relief maps, ores from world-famous mining regions, minerals from everywhere, and petrifactions illustrative of the many rock strata. Highly important fossilized skeletons found in South Dakota, particularly in the Big Bad Lands, collected, prepared and mounted by members of the School of Mines, add their large share of interest.

Here one may see the oldest thing in South Dakota, a quartz boulder that has been subjected to the vicissitudes of the ages, and which, according to the geological calculations of the day, has witnessed the coming and going of more than a hundred million years. Specimen after specimen show the handiwork of Nature and each one has its interesting individual story.

The museum has many fine large pieces of the unique sand-calcite crystals from the Bad Lands. One piece occupying its own glazed case weighs approximately three tons. The form of the individual crystals and their intricate arrangement with reference to one another are constant sources of wonder. A concretion made up chiefly of iron and manganese and with geometric figures covering its surface is beautifully representative of the countless concretionary masses found in such great variety and abundance within the shales which cover so much of the plains country.

The collections contain a number of banded agates. Among these is a slice, free from artificial coloring, showing in characteristic manner thin concentric shells of finely crystalline silica deposited successively from the outside walls of a rock-cavity toward the center with, near the center, more coarsely crystallized silica in the form of quartz.

One of the attractive mineral exhibits of the museum is the considerable series of gold-leaf covered plaster of paris reproductions of the world's most famous gold nuggets. The original of the largest of these, the Welcome nugget, found in Australia in 1853, was nine inches in diameter, twenty inches long, weighed 2166 ounces and had a value of $41,883. A mineral flag occupying a prominent place in the museum measures three feet by five feet. The stars are of Black Hills aragonite, the blue field is of Arizona azurite and the stripes are of Black Hills white quartz and rose quartz. The flag weighs approximately 400 pounds. To many people the most interesting feature of the museum is the display of fossils. There is a small but well-selected collection of invertebrates beginning with those found in the very oldest sedimentary rocks and arranged in order of age leading up to the present. One may here see well-preserved forms of creatures that lived in the days when the earth was young and by means of these he in some degree may trace the harmony that was wrought on the chain of development through the millions of passing years.

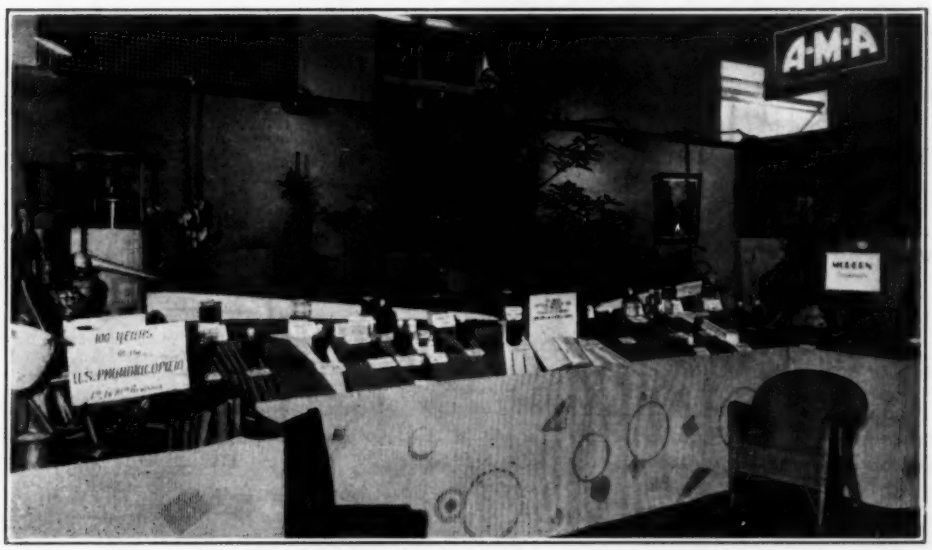
Backboned animals in time appear and with these the interest increases. It is especially worthy of note in this connection that the Black Hills region, including, as it does, the White River Bad Lands, is one of the most famous vertebrate fossil grounds of the world. Perhaps no area of equal extent anywhere has provided so much convincing material illustrative of how the Creator has built up the rocks and soils of the land and, along with this, has developed the higher animals and guided them along the great highway of life. Layer upon layer of muds and sands and gravels were laid down through the unnumbered years and these were accompanied in rhythmic manner by animals and plants exquisitely fitted to the conditions of the time.

The South Dakota School of Mines through its museum has endeavored to utilize this educational asset so conveniently provided for the institution. The older rocks of the Black Hills and the ores and minerals they contain have their peculiar appeal, but the later rocks and especially the Bad Lands with their wonderful fossils help to round out in a beautiful manner the complete geological record.

The museum has on display from the fossil-bearing beds of the Bad Lands, the complete skeleton of an ancestral alligator; the head of a peccary; heads of rhinoceroses and giant pigs; male and female skulls of the bizarre antelope-like creature known as Protocorea; remains of camels and three-toed horses, and skulls of tapirs, titanatheres, et cetera. Three wonderful slabs, each in its separate glazed case, show complete skeletal mounts. One of these is that of the saber-tooth tiger, Dinichtis. Another shows two beautiful skeletons, male and female, of *Orendon gracilia*. This is believed to be the finest mount of its kind in America. The third contains a superbly preserved skeleton of *Oredon cublertsoni*, and, wonderful to relate, is that of a mother accompanied by unborn twins. In so far as known this is the only discovery of the kind among mammals that has ever been made.

These skeletons all show the exquisite technique of the preparator's art and they and the many other skeletons and skeletal parts, prepared and awaiting preparation, testify to the many days of careful searching in the Bad Lands country in order that these testimonials of bygone ages may be made to serve our pleasure and inspiration.

The School of Mines in addition to the Geological Museum has important collections illustrative of Mining, Metallurgy and Biology. These are not houses with the geological display but are nevertheless open to inspection much of the year. The Black Hill Herbarium, cared for in a room adjoining the Biological laboratories, is doubtless the most complete collection of mounted Black Hills' plants to be found anywhere. They are the basis of several papers prepared and published by Mr. A. C. McIntosh, head of the department of biology, who has personally collected and mounted practically all of the specimens.



U. S. P. Exhibit at Portland A. M. A. meeting, 1929.

SCIENTIFIC SECTION

SOLUBILITY DETERMINATIONS OF U. S. P. X CHEMICALS.*

BY WOLFGANG SCHNELLBACH AND JOSEPH ROSIN.

The purpose of the following study was to determine accurately, when possible, the solubilities of those chemicals of the U. S. P. X, for which no definite solubility figures are given. In these cases the U. S. P. indicates the solubility by such terms as: "very soluble," "slightly soluble," etc. These expressions, however, indicate such a wide range in solubility as to make their usefulness rather limited.

In determining solubilities the procedure of Seidell (see *Hygienic Laboratory Bulletin* 67, 1910) was generally used. The solutions were prepared in thick-walled Pyrex test-tubes of about 50 cc. capacity. The tubes were tightly closed with rubber stoppers, or, if the nature of the solvent did not permit the use of rubber, cork stoppers were used, which had been previously paraffined. These tubes were attached to a rotating disc immersed in a constant-temperature water-bath and kept at the temperature desired for the solubility determination.[1]

Great care was taken to prevent volatilization of the solvent or absorption of moisture in drawing off the solutions for analysis.

Special apparatus was constructed for this purpose (see Fig. 1). A cylinder (*A*) wide enough to hold a 50-cc. weighing bottle (*B*) was closed with a two-hole rubber stopper. A glass tube was passed through one of the openings in the rubber stopper and connected by rubber tubing to a suction pump. Into the other hole was inserted a small ground-edge funnel (*C*). Another ground-edge funnel (*D*) of the same size was inverted over the first funnel, being connected by rubber tubing with a U-tube (*E*) of a bottle (*F*) through which air enters the apparatus when suction is applied. If the solution to be filtered contained glycerin, for instance, fused calcium chloride was placed in the U-tube to absorb the moisture of the influent air. If alcohol or water was the solvent, the air was saturated by passage through the proper solvent placed in the bottle (*F*).

In determining the exact quantity of solute present in the solutions, two or more methods of analysis, wherever possible, were employed as checks. Frequently a solution may be analyzed by merely evaporating the solvent and weighing the residue, while in other cases gravimetric or volumetric methods of analysis must be used. The character of the solvent used frequently necessitated modifications of the standard procedure of analysis as given in the U. S. P. and by other authorities.

Prior to their use in solubility determinations, the solutes and solvents were carefully analyzed to insure their being of U. S. P. X quality.

PREPARATION OF THE SOLUTIONS.

In most cases the saturation point at the desired temperature was approached from two directions: one from room temperature and hereafter designated "under-

* This research has been made possible by a grant from the Board of Trustees of the U. S. Pharmacopœial Convention under the direction of Dr. George D. Rosengarten, Chairman of the Subcommittee on Organic Chemistry. Research laboratory facilities were contributed by the Philadelphia College of Pharmacy and Science.

[1] The constant-temperature bath and the agitation apparatus used in this work will be described in detail later on.

saturated" and the other, wherever the solute permitted heating without being decomposed, from a higher temperature than the one desired and hereafter designated "supersaturated." The solutions prepared by either method were kept at the desired temperature and continuously or frequently agitated for various lengths of time until equilibrium was attained.

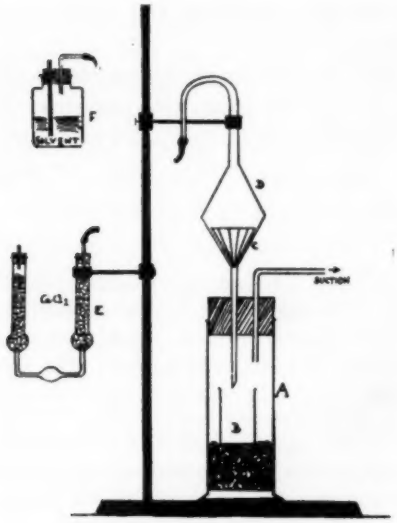


Fig. 1

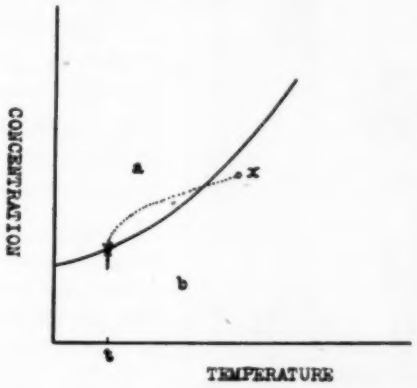


Fig. 2

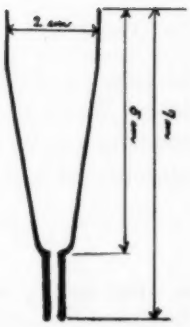


Fig. 4

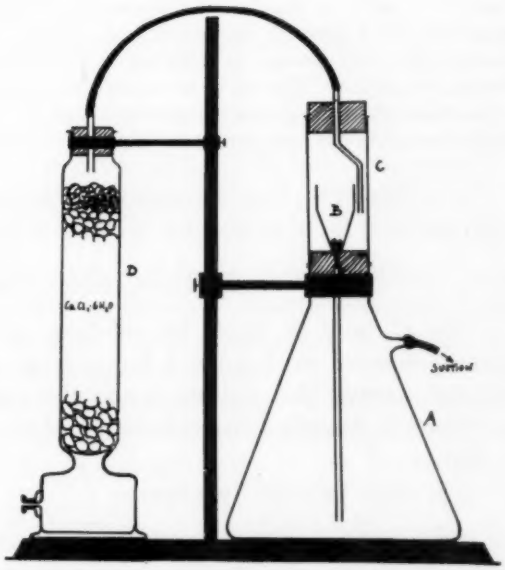


Fig. 5

In preparing the solution from "undersaturation" the solute was quickly and finely powdered before being mixed with the solvent. In this mixture the smallest particles of the solute, having relatively the largest surface, will dissolve first while the larger particles remain, thereby lowering the solution tension of

the solute. Therefore, another small portion of finely powdered solute was added some time after the preparation of the solution when the solution was supposed to have reached a concentration close to the saturation point. In preparing the solution from "supersaturation," sufficient of the solute was used to leave a slight amount undissolved after heating. A distinct increase in the amount of the solute may be observed after keeping the solution at the desired temperature.

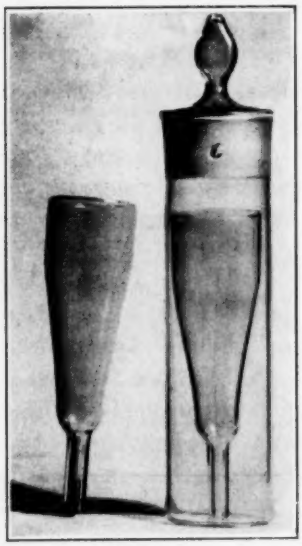


Fig. 3.

The solutions prepared by these two methods approach the point of saturation from two opposite directions, coming to equilibrium at the point of saturation for the desired temperature. This may be seen in the sketch on page 763 (Fig. 2) which shows a typical saturation curve.

The field below the curve, indicated by b, represents undersaturated solutions, which therefore will dissolve more of the solute until the saturation point is reached. Such is the case with the solutions prepared at room temperature. The field above the curve, indicated by a, is the region of supersaturated solutions. In preparing the solutions by heating solute and solvent, this solution may reach a point, represented by x. This solution is not necessarily saturated at the temperature represented by this point, but it contains more dissolved solute than a solution which is saturated at the desired temperature, indicated by t. This solution is, therefore, supersaturated with respect to the desired temperature. On quickly cooling the heated solution the concentration may change, as indicated by the dotted line. Solute will separate until true equilibrium is attained. Whether or not equilibrium has been attained may be determined by analyzing portions of the solutions prepared by either method, over varying periods of time until concordant values of the concentration of the solution are obtained.

It is apparent that the correct saturation point is obtained when the solutions prepared by both methods yield upon analysis the same concentration values.

THE CALCULATION OF THE SOLUBILITY.

The U. S. P. X states the solubility as the number of cubic centimeters of solvent required to dissolve 1 Gm. of the solute. There is no simple relation existing between this statement and the experimental results. In the following paragraph is described the calculation of the solubility as based upon the results of analyses.

The analysis yields two figures:

The weight in grams of solution used for analysis, which may be indicated by x, and the weight, also in grams, of solute, indicated by y, found to be present in x Gm. of the solution. The number of cubic centimeters of the solvent, indicated by z, required to dissolve 1 Gm. of solute will then be found by the following equation:

$$z = \frac{x - y}{y \cdot k}$$

where k is the density of the solvent at the temperature of the experiment. In this equation z is expressed in terms of two variables x and y, and of the density which is a constant at any par-

ticular temperature. If equal weights of the solution to be analyzed could always be taken, then x also would be a constant. In such a case y only will vary due to the analytical errors and consequently z also will vary. The ratio of variation of z with regard to y is expressed by the differential derivative of this equation, which is

$$\frac{dz}{dy} = \frac{-x}{y^2 \cdot k}$$

From this, it may be seen, that z varies inversely as the square of y. If y is small compared to x, as it is the case with slightly soluble substances, z will vary to a very large extent, even if the difference between y' and y'', which represent the results of the analyses of two equal portions of the same solution, is very small. Consequently great variations will appear in the results of a number of analyses of the same solution, if such results be expressed by the U. S. P. method.

This fact necessitated the use of another method of calculating the solubility. The postulate of such a method is that the variables in the equation should appear in a direct relationship of the first degree. In such an equation the differential derivative would be a constant, which means that the variations of the solubility values, calculated by this equation, would amount to a constant multiple of the difference between the results of the two analyses, y' and y''.

An equation which satisfies these requirements exists in the statement of the percentage (by weight) of solute present in solution. This solubility, w, is found by the equation

$$w = \frac{100\ y}{x}$$

In this equation the ratio of variation of w with regard to y is independent of y, as may be seen from the differential derivative

$$\frac{dw}{dy} = \frac{100}{x} \text{ (x being constant)}$$

Using this equation for the calculation of solubility, the variation in the results of duplicate analyses of a solution of a slightly soluble substance and of a solution of a very soluble substance will produce in both cases directly proportional variations in the expression of solubility by percentage, w.

The statement of solubility as the number of grams of solute present in 100 Gm. of the solution represents the actual experimental results expressed in percentage. This form of expression, being used quite extensively, appears in the tables reporting the results of the solubility determinations.

In the following papers the calculation of the solubility, Z, as stated in the U. S. P. X, is derived from all the values, w, of the saturated solutions, by taking the arithmetic mean, W, and substituting in the equation

$$Z = \frac{100 - W}{W \cdot k}$$

the symbol k denoting the density of the solvent at the experimental temperature.

The Solubility of Magnesium Sulphate Heptahydrate ($MgSO_4.7H_2O$) in Water and Glycerin at 25° C.

The quantity of magnesium sulphate in solution was determined by three methods. 1. From "Residue." 2. From SO_4'' contents. 3. From $Mg^{\cdot\cdot}$ contents.

1. *Residue Method.*—A weighed quantity of the solution was evaporated to dryness and then the residue carefully ignited to constant weight. The final product was anhydrous magnesium sulphate.

2. *Sulphate Determination.*—The procedure used in the estimation of sulphate is a slightly modified form of the one originally introduced by H. L. Winkler (Budapest),[1] which consists in precipitating the SO_4'' as $BaSO_4$ under certain well-defined conditions. The method insures results of great accuracy.

The solution of the sulphate, either neutral or of known acidity, measuring about 100 cc. and containing an amount of SO_4 yielding not more than 0.3 Gm. of $BaSO_4$ is heated to boiling and from 5 to 10 cc. (but using equal amounts for duplicate analyses) of a 5 per cent barium chloride solution (5.0 Gm. of $BaCl_2.2H_2O$ and water to make 100 cc.)[2] are added drop by drop. The solution is kept boiling for several minutes after precipitation and then allowed to stand over night. The precipitate is collected on a pledget of cotton placed in a "cup funnel" (see Fig. 3 and Fig. 4). The "cup funnel" containing the cotton must be previously dried at 130° for three hours.

When collecting the precipitate the supernatant liquid is first decanted through the cotton pledget in the funnel and the clear filtrate discarded. The precipitate is then mixed with distilled water and the mixture poured into the funnel so that the pledget of cotton will be completely covered with $BaSO_4$. If the filtrate is not clear it is refiltered. If directions are carefully followed the filtrate will be clear from the first. The precipitate is dried for two hours at 130° C. The "cup funnel" is then taken out of the drying oven, placed in a weighing bottle of proper size, allowed to cool for fifteen minutes then placed in the balance case and finally weighed after standing for fifteen more minutes. A desiccator is not used during cooling. Here, as in all other determinations in which the "cup funnel" is used, the lid of the weighing bottle which holds the funnel is grooved to permit the access of air.[3]

Before using the "cup funnel" for the collection of the precipitate, the funnel stem is lengthened by attaching a piece of glass tubing to provide the advantage of a long stem funnel.

In applying this method to the determination of sulphates in solutions resulting from solubility determinations, the "cup funnel" is attached to a suction flask, the use of which materially diminished the time required for filtration (for arrangement of this apparatus see description and figure given in "The determination of Magnesium," described further on).

Winkler found that the precipitate obtained from a very acid solution contains barium hydrosulphate which gives low results. He established a table of correction factors for the precipitates obtained from solutions of varying acidity. This table shows that the weight of precipitate obtained from a neutral solution requires no correction, if the precipitate is ignited. It also shows that if the sulphate is precipitated from a solution containing 2.25 cc. of tenth-normal HCl per 100 cc. (0.00225 normal) and the precipitate collected and dried according to Winkler's procedure ("cup funnel" method), the results so obtained require no correction.[4]

[1] *Zeitschrift für angewandte Chemie*, **30, I,** 251–252, 259–260, 301–303 (1917). Winkler and his coöperators investigated the composition and amount of precipitate obtained from neutral solutions and solutions of varying degrees of acidity and also from solutions containing other salts beside the sulphate.

[2] Five cc. of a 10 per cent solution of $BaCl_2$ are originally recommended by Winkler. A weaker solution, however, has been preferable in this work as it dealt in many cases with small amounts of SO_4''; an excess of SO_4'' as compared to $Ba^{\cdot\cdot}$ was found to be essential in order to obtain a crystalline precipitate.

[3] In this work a weighing bottle was used which had a single perforation through the upper part of the bottle and the lid (see Fig. 4).

[4] The following analyses performed by this method yielded slightly higher results.

In some cases the sulphate was determined according to the commonly used procedure which consists of igniting the precipitate. The precipitate was obtained from a neutral solution requiring no correction after ignition.

3. *Magnesium Determination.*—In determining the magnesium content of magnesium sulphate or its solutions the method of Winkler (Budapest),[1] slightly modified, was used. The magnesium is precipitated as magnesium-ammonium phosphate hexahydrate ($MgNH_4PO_4.6H_2O$) under conditions yielding a crystalline precipitate which may be easily collected on cotton, dried over $CaCl_2.6H_2O$ (having the same vapor pressure as $MgNH_4PO_4.6H_2O$) and weighed. The original procedure is as follows:

> A quantity of the salt corresponding to not more than 0.05 Gm. of magnesium, and 3 Gm. of ammonium chloride is dissolved in 100 cc. of water in a beaker and heated to boiling. The solution is then removed from the source of heat and mixed with 10 cc. of a 10 per cent ammonia water and 10 cc. of a 10 per cent solution of secondary sodium phosphate (10 Gm. of $Na_2HPO_4.10H_2O$ and water to make 100 cc.), the latter being added in a thin stream from a burette, while agitating.

The precipitate is at first amorphous but upon standing about fifteen minutes begins to assume a crystalline form. The conversion into the crystalline form is completed in from two to three hours if the directions have been carefully followed. The precipitate is allowed to stand in the beaker for twenty-four hours at a temperature of from 16° to 18° C. After this time the crystalline precipitate is collected on a pledget of cotton placed in a "cup funnel."[2] In collecting the precipitate the supernatant liquid is first decanted through the cotton pledget in the "cup funnel" and subsequently the precipitate remaining in the beaker is mixed with 1 per cent ammonia water and the whole transferred to the funnel. If the directions for the precipitation of the magnesium have been followed rigidly, the filtrate will be clear from the first. About 50 cc. of 1 per cent ammonia water are used for washing the beaker and precipitate. Finally the precipitate is washed with two 10-cc. portions of recently distilled methyl alcohol, the first portion being used to wash the precipitate, while gently stirred with a glass rod, and the second to wash back into the funnel the particles clinging to the rod. The funnel and contents are then dried over $CaCl_2.6H_2O$ for twenty-four hours at a temperature of from 20° to 25° C. and finally weighed in a weighing bottle of proper size after standing for ten minutes in the balance case. From this result is calculated the amount of magnesium salt present in the analyzed solution. Prior to the collection of the precipitate the funnel and the cotton pledget are washed with diluted ammonia water and subsequently with recently distilled methyl alcohol, the alcohol removed by drawing air through the funnel by means of suction and the funnel and cotton then dried for twenty-four hours over $CaCl_2.6H_2O$ and then weighed as already mentioned.

In applying this method for the analysis of solutions resulting from solubility determinations of magnesium salts, the procedure is slightly modified, in so far as the drying of the precipitate is concerned. Air, entering through a tower filled[3]

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[1] *Zeitschrift für angewandte Chemie*, **31, I,** 211–212 (1918).

[2] See Figs. 3 and 4 and for description under: "Sulphate Determination."

[3] This device was used by Winkler later on, as told to one of the authors Dr. Schulek, a former assistant of Winkler.

with $CaCl_2.6H_2O$, is drawn through the funnel and contents until they become of a constant weight. This treatment materially shortens the time of drying. The drying requires but one or two hours as compared with twenty-four hours in the original procedure.

The apparatus used for filtering and drying the $MgNH_4PO_4.6H_2O$ is illustrated in the sketch on page 763 (Fig. 5).

A is a suction flask attached to the pump. The flask is stoppered with a rubber stopper having a single perforation to hold the "cup funnel" *B*, the stem of which slides into a tube of slightly larger diameter, which nearly reaches to the bottom of the suction flask. The arrangement thus far described is used in the actual filtration. After the precipitation is collected, the cylinder *C* is slipped over the funnel. This cylinder is closed at the other end by a rubber stopper which is perforated to allow the entrance of a glass tube, so bent that the incoming air will not be blown directly on the precipitate. The other end of the glass tube is connected, by rubber tubing, with the tower *D*, which is filled with $CaCl_2.6H_2O$. The suction pump is then turned on and the precipitate is dried to a constant weight.

TEST AND ANALYSIS OF THE MAGNESIUM SULPHATE USED FOR THE EXPERIMENTS.

The magnesium sulphate used in the solubility determinations met the U. S. P. X requirements for purity and yielded the following quantitative results:

TABLE I.—RESULTS OF THE QUANTITATIVE ANALYSIS OF THE MAGNESIUM SULPHATE HEPTAHYDRATE USED FOR THE SOLUBILITY DETERMINATIONS.

Method of analysis.	Gm. of magnesium sulphate taken.	Gm. of ..... obtained.	Equal to Gm. of magnesium sulphate.	Per cent magnesium sulphate.
"Residue method"	0.5652	0.2851 residue	0.2851	50.44
	0.5276	0.2661 residue	0.2661	50.43
"Sulphate method"				
$BaSO_4$ precipitated from neutral solution and ignited	0.25974[1]	0.2543 $BaSO_4$	0.1311	50.49
	0.25974	0.2548 $BaSO_4$	0.1314	50.59
	0.25974	0.2561 $BaSO_4$	0.1321	50.84
"Sulphate method"	0.25974	0.2559 $BaSO_4$	0.1320	50.80
(Winkler)	0.25974	0.2559 $BaSO_4$	0.1320	50.80
	0.25974	0.2560 $BaSO_4$	0.1320	50.82
"Sulphate method"	0.2874	0.2836 $BaSO_4$	0.1463	50.89
(Winkler-Schulek)[2]	0.2160	0.2131 $BaSO_4$	0.1099	50.88
"Magnesium method"	0.25974	0.2684 $MgNH_4PO_4.6H_2O$	0.1316	50.67
(Winkler)	0.25974	0.2682 $MgNH_4PO_4.6H_2O$	0.1315	50.63

[1] Ten-cc. portions of a solution of 2.5974 Gm. of magnesium sulphate in 100 cc. were taken for these analyses.

[2] This is a slightly modified form of Winkler's original method. *Zeitschrift für angewandte Chemie*, **33, I,** 59–60, 159–160, 162–163 (1920).

Magnesium sulphate heptahydrate ($MgSO_4.7H_2O$) contains theoretically 48.84 per cent of $MgSO_4$. The salt under examination was slightly effloresced.

SOLUBILITY OF MAGNESIUM SULPHATE HEPTAHYDRATE IN WATER AT 25° C.

Four separate solutions were prepared for the solubility determination of magnesium sulphate in water. Experiments I and III were prepared at room temperature, thereafter reaching the saturation point from undersaturation; Experi-

ments II and IV were prepared by boiling solute and solvent in the way described in the introduction. The solutions of Experiments I and II were analyzed by the residue method and the solutions of Experiments III and IV by Winkler's methods for sulphate and magnesium. The results conform closely.

TABLE II.—RESULTS OF THE SOLUBILITY DETERMINATION OF MAGNESIUM SULPHATE HEPTAHYDRATE ($MgSO_4.7H_2O$) IN WATER AT 25° C.

Stated as Percentage of Solute in Solution.

Experiments.	Method of analysis.	Time of preparing solution, days. 1.	3.	7.	12.	14.
I		...	54.67	...	...	...
Prepared by undersaturation method	"Residue" method	...	54.83	...	...	...
II						
Prepared by supersaturation method	"Residue" method	...	54.76	...	...	...
III						
Prepared by undersaturation method	"Sulphate" method	...	...	...	54.44	...
	(Winkler)	...	...	...	54.45	...
	"Magnesium" method	...	...	...	54.43	...
	(Winkler)	...	...	...	54.37	...
IV	"Sulphate" method	55.53	...	54.42	...	54.45
Prepared by supersaturation method	(Winkler)	...	...	...	...	54.43
	"Magnesium" method	...	...	...	...	54.40
	(Winkler)	...	...	54.41	...	54.38
		...	...	...	...	54.39

The average of all the results stated in this table is 54.57.

Conclusion.—54.57 Gm. of $MgSO_4.7H_2O$ are present in 100 Gm. of an aqueous solution, saturated at 25°C.

Therefore: One gram of $MgSO_4.7H_2O$ is soluble in 0.835 cc. (= 0.833 Gm.) of water at 25° C. (Density of water 25°/4° = 0.9970.)

This result is not in accordance with the statement of the U. S. P. X which states: One Gm. of Magnesium Sulphate is soluble in 1.3 cc. of water at 25° C.

Other statements:
Seidell, "Solubilities of Inorganic and Organic Substances," 1907:
38.5 Gm. of $MgSO_4$ per 100 Gm. of water at 25° C., which is equal to
56.92 Gm. of $MgSO_4.7H_2O$ in 100 Gm. of solution.

"Handbook of Chemistry and Physics" (13th edition):
26.2 Gm. of $MgSO_4$ in 100 Gm. of solution at 20° C.
29.0 Gm. of $MgSO_4$ in 100 Gm. of solution at 30° C.
Interpolated solubility value for 25° C.:
27.6 Gm. of $MgSO_4$ or
56.51 Gm. of $MgSO_4.7H_2O$ in 100 Gm. of solution.

"Chemiker Kalender," 1929 (vol. II, 329):
26.8 Gm. of $MgSO_4$ or
54.88 Gm. of $MgSO_4.7H_2O$ in 100 Gm. of solution at 25° C.

SOLUBILITY OF MAGNESIUM SULPHATE HEPTAHYDRATE IN GLYCERIN AT 25° C.

The magnesium sulphate used in this determination was taken from the same specimen as in the determination of the water solubility. The glycerin

used in this determination conformed with the requirements of the U. S. P. X. The specific gravity was found to be 1.250 $\frac{25°}{25°}$ which is equivalent to a density of 1.246 $\frac{25°}{4°}$.

The solution in Experiment I was prepared by the undersaturation method finely powdered magnesium sulphate being used. This mixture was shaken by hand, the mechanical agitation apparatus not having been constructed at this time. The solution was analyzed gravimetrically, the sulphate being determined as $BaSO_4$. Analysis of the solution after a period of 24 days showed a slight increase (see Table III) of the concentration as compared with the solution analyzed 11 days after its preparation. The slight increase is probably due to the fact that the solution was shaken by hand and thereby did not become completely saturated. To determine the saturation point other experiments were made. In Experiments II and III a mechanical agitation device was applied. The solution in Experiment II was prepared at room temperature and the solution in Experiment III was heated and then cooled to 25° C. while being agitated. The solutions were analyzed by Winkler's methods for the determination of sulphate and magnesium (already described).

TABLE III.—RESULTS OF THE SOLUBILITY DETERMINATION OF MAGNESIUM SULPHATE HEPTAHYDRATE ($MgSO_4.7H_2O$) IN GLYCERIN AT 25° C.

Experiments.	Method of analysis.	Time of preparing solution, days. 7.	11.	17.	24.
I					
Prepared by undersaturation method	$BaSO_4$ precipitated from slightly acid solution and ignited	...	35.61	...	36.02
		...	34.97	...	36.37
II	"Sulphate" method	42.99	...	...	...
Prepared by undersaturation method	(Winkler)	42.75	...	...	...
	"Magnesium" method	42.80	...	...	...
	(Winkler)	42.78	...	...	...
III	"Sulphate" method	42.82	...	42.40	...
Prepared by supersaturation method	(Winkler)	42.82	...	42.40	...
				42.33	
	"Magnesium" method	42.03	...	42.25	...
	(Winkler)	42.56	...	42.29	...

The average of the results of the saturated solutions, from Experiment II (7 day time interval) and Experiment III (7 and 17 day time interval) is 42.56.

Conclusion.—42.56 Gm. of $MgSO_4.7H_2O$ are present in 100 Gm. of a glycerin solution, saturated at 25° C.

Therefore: One Gm. of $MgSO_4.7H_2O$ is soluble in 1.08 cc. of glycerin (= 1.35 Gm.) at 25° C. (density of glycerin at 25° = 1.246).

This result is in accordance with the statement of the U. S. P. X which states:

One gram of Magnesium Sulphate is soluble in about 1.1 cc. of glycerin at 25° C.

However, from theoretic consideration, there should be no true equilibrium between $MgSO_4.7H_2O$ and glycerin, as the system consists of four phases: $MgSO_4$, H_2O, glycerin and water vapor. A variation in the excess of $MgSO_4.7H_2O$ should accordingly cause variation in the solubility, for the water of crystallization is

partially absorbed by the glycerin, acting as a diluent. But contrary to theory the results of the Experiments II and III, of which the latter actually contained much larger an excess of solute, conformed closely. This would show that the tension of $MgSO_4.7H_2O$ to retain its water of crystallization is greater than the tension of glycerin to absorb water.

SOME ANALYTICAL ASPECTS OF COD LIVER OIL.*

A. E. BRIOD, R. VAN WINKLE, A. E. JURIST AND W. G. CHRISTIANSEN.

The important place which cod liver oil has attained in the prevention or treatment of certain deficiency diseases is now uncontested.

Little is to be found in the literature, however, on some of the lesser known properties of this oil and a study of a few of these properties brought out some interesting facts which form the basis of this paper.

All results listed below were obtained on good medicinal grade cod liver oil, from which the "Stearin" had been removed.

SPECIFIC GRAVITY AND VISCOSITY, IODINE AND SAPONIFICATION VALUES.

A preliminary examination of an average sample of Newfoundland cod liver oil gave the following results:

Specific gravity at $\frac{25^\circ\ C.}{25}$	0.9221
Hanus Iodine Value	157.2
Viscosity at 100° F. (Saybolt Universal Viscosimeter)	160 sec.
Saponification Value	186.1

UNSAPONIFIABLE MATTER.

The method used for the determination of the unsaponifiable residue was the official one given in the "Methods of Analysis of the A.O.A.C.," 1925 edition and gave for per cent of unsaponifiable matter: 0.88.

During this test care must be exercised to prevent oxidation after evaporation of the alcohol, especially since a double saponification is nearly always advisable if accurate results are desired. In this respect, the U. S. P. method is not believed to yield sufficiently exact figures and should be amended to include resaponification of the residue obtained after hydrolysis of the oil.

ACETYL VALUE.

The acetyl value, defined as the number of mg. of potassium hydroxide required for the neutralization of the acetic acid obtained on saponifying 1 Gm. of the acetylated fat, was determined next, the filtration method described by Lewkowitsch (1) being used.

The figures obtained were: Apparent acetyl value: 11.1; true acetyl value: 8.7.

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* Scientific Section, A. PH. A., Portland meeting, 1928.

It must be remembered that the acetyl value, in addition to being a measure of the hydroxy-acids present, also indicates free alcohols, oxidized acids, mono and diglycerides and, as Lewkowitsch points out, further includes the number of milligrams of potash required to saponify the acetylated cholesterol.

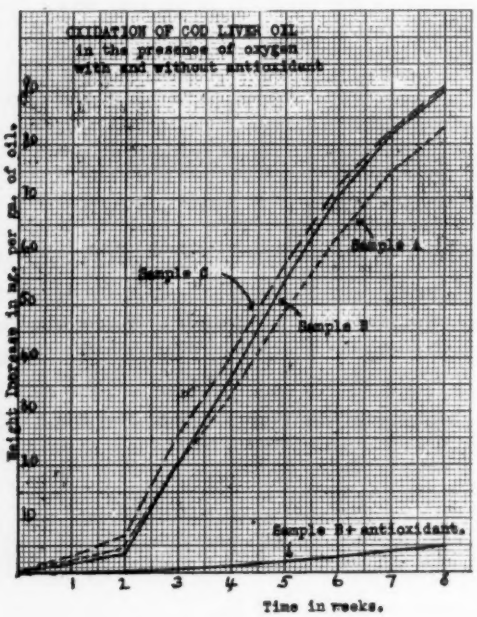
OXIDATION OF COD LIVER OIL
in the presence of oxygen
with and without antioxidant
Weight Increase in Mg. per Gm. of oil.
Sample A
Sample B
Sample B+ antioxidant.
1 2 3 4 5 6 7 8
Time in weeks.

Fig. 1.

OXIDIZED FATTY ACIDS.

Fahrion's (2) method was used for this determination, with the only modification that the test was carried out under nitrogen protection. The figure thus obtained was: Per cent of oxidized fatty acids: 0.50.

OXIDIZABILITY VALUE.

The oxidizability value represents the number of milligrams of oxygen required to oxidize the water-soluble constituents of 100 Gm. of the oil and was determined by following Kerr's (3) modification of Issoglio's (4) original method. The values thus obtained on four different samples are given in the following table:

TABLE I.—OXIDIZABILITY VALUE OF COD LIVER OILS.

Sample.	Oxidizability value.
A	12.2
B	16.0
C	18.7
D	16.4

In his work on vegetable oils and lard, Kerr regards an oxidizability value of 15.0 or more as strong confirmatory evidence of rancidity. This does not appear to be the case, however, as far as cod liver oil is concerned. We have repeatedly found that many samples would give a positive Kreis test for rancidity, even though known to be fresh.

The above factors prompt us to believe that cod liver oil contains one or more compounds, probably aldehydes, which often give a positive Kreis reaction and induce a high oxidizability value without giving the oil any rancid odor or taste.

Such a belief is in agreement with the findings of Powick (5), who gives epihydrin aldehyde or another derivative of the action of H_2O_2 on acrolein as responsible for a positive Kreis test, and heptylic aldehyde as primarily responsible for the rancid odor.

Under these conditions, it would appear that both Kreis test and oxidizability value have only a very limited usefulness when applied to cod liver oil.

PEROXIDES IN COD LIVER OIL.

Oxidation of cod liver oil is believed to start through a peroxidation of its unsaturated glycerides and fatty acids, among which the best known is clupanodonic acid, and a study of many tests was undertaken for the detection of peroxides in cod liver oil:

a. The *hydriodic acid test,* used by Yoder (6), was found to be unspecific and absorption of iodine by the oil militates against it.

b. Schöne's (7) *titanium sulphate test* was not found sufficiently delicate for the detection of small amounts of peroxides.

c. The *potassium dichromate* and *aniline test* described by Bach (8) was also eliminated on account of its lack of sensitiveness.

d. The *potassium iodide and starch test* used by Powick (5) was tried next and discarded on the same account.

e. Schimkus' *iodoform test,* as described in his paper on catalytic activity of light-exposed cod liver oil (9), could not be applied to the detection of small traces of peroxides, because of the unstability of the reagent.

The same author's *potassium iodide and sodium thiosulphate test* was also found to lack sensitiveness.

f. Stamm's *phenolphthalein reagent* (10), used for the determination of peroxides in ether, was tried on the peroxides of cod liver oil but gave only negative results, even in the case of oils known to be strongly peroxidized.

g. The only test which finally gave us entirely satisfactory results was a *guaiacum and hemoglobin test,* based on C. F. Schönbein's (7) original guaicum test for hydrogen peroxide. It was applied to cod liver oil as follows:

Two reagents' solutions are freshly prepared: 0.1% hemoglobin in water; 0.5% guaiacum in absolute alcohol.

Approximately 10 cc. of the oil to be tested are placed in a test-tube, well shaken with an equal amount of absolute alcohol and set aside for a short time until the two layers have again separated.

In another test-tube 5 cc. each of the guaiacum and hemoglobin solutions are mixed together and 5 cc. of the alcoholic extract obtained in the upper layer of the first test-tube are finally added and well shaken with the reagents. In the presence of peroxides, a blue color will develop within a few minutes, the rate of development and depth of color being closely proportional to the amount of peroxidation in the oil.

Tested in this way, crude cod liver oil will generally yield a positive test, which is quickly intensified if the oil is left exposed to the air for any length of time.

The ease with which cod liver oil thus becomes oxidized suggests that ways and means be found to stop or retard the process of oxidation, which impairs both its taste and its vitamins' potency.

ANTIOXIDANTS AND COD LIVER OIL.

The action of many negative catalysts or antioxidants (11, 12, 13, 14, 15) on the rate of oxidation of cod liver oil was studied with the double purpose of preserving both the flavor and the potency of the oil.

Among the substances which were used in these experiments, representatives of the following types of compounds were studied: aromatic amines, mono and poly hydroxyphenols, aminophenols and two antioxidants secured (*a*) from the Goodyear Tire and Rubber Co. and (*b*) from the duPont Laboratories. A variety of experimental conditions were used.

A striking example of some of the results obtained, however, is given in the following graph, which represents a set of experiments performed at room temperature in an atmosphere of oxygen.

IRON AND SULPHUR IN COD LIVER OIL.

The percentage of iron and sulphur present in cod liver oil were also determined.

The method used for the iron determination was as follows: 80 to 100 Gm. of the oil were weighed to the third decimal place in a fused quartz dish. The oil was then ashed, using great care to burn off all the carbon without permitting any ash to be blown out of the dish or carried out by the flames produced during carbonation of the oil. The ash was taken in aqua regia, diluted with water, filtered and the resulting clear solution tested for iron by the method of E. Lyons (16), using thioglycollic acid in slightly alkaline solution. This test has been found accurate to within one part in ten million. The results which were obtained are given in the following table:

TABLE II.—IRON CONTENT OF COD LIVER OIL.

Sample.	Iron content. Parts in 10,000,000.
A	4.7
B	1.3
C	3.9
D	3.4

SULPHUR CONTENT OF COD LIVER OIL.

The literature on cod liver oil contains references to the fact that sulphur compounds are present in cod liver oil (17). The latter statements are purely on a qualitative basis and the form in which the sulphur is present is little understood. It was our purpose to determine first the sulphur content of various cod liver oils quantitatively.

The various methods of sulphur analysis were reviewed in order to obtain one which might be adaptable to cod liver oil.

Lamp Method (18).—Used for low boiling petroleum fractions. Low combustibility of cod liver oil eliminated any adaptation in this case.

Bomb Methods.—The use of a Parr bomb was not feasible due to the large amount of oil sample necessary for each analysis—two grams. An oxygen bomb would most likely be very satisfactory but was not available for this work.

Other Oxidation Methods.—Sanders (19) combines a previous oxidation using nitric acid with the bomb method. Pattern (20) uses metallic sodium and bromine to carry out his analysis. Smith (21) oxidizes the sulphur in coal, using potassium chlorate and sodium peroxide. Andrews (22) oxidizes with nitric acid

in the presence of magnesium oxide. Heslinger (23) burns the sample in a quartz furnace, the sulphur dioxide liberated is absorbed in hydrogen peroxide and the sulphur determined by titration with standard alkali. Pregl (24) oxidizes the SO_2 catalytically with platinum. Osborne fuses with a mixture of sodium carbonate and sodium peroxide. The above methods were considered carefully and in several cases experimented with, but in every instance were found objectionable for adaptation to cod liver oil.

Trotman and Bell (25) modified the Benedict-Davis method so that it would be applicable for determining sulphur in wool. We were able to modify their method so that it would also be adaptable to cod liver oil.

Two grams of oil are taken and saponified by heating two hours on the steam-bath with 6 cc. of 10 *N* sodium hydroxide and 10 cc. of water. One hundred cc. of a solution containing (25 Gm. $Cu(NO_3)_2$, 25 Gm. NaCl and 10 Gm. NH_4NO_3/-100 cc.) are added and the mixture evaporated to dryness on a steam-bath. It is then ignited over a Bunsen flame, slowly at first, until all of the copper is in the form of CuO. The ignited mass is digested in water containing 40 cc. of concentrated hydrochloric acid, filtered if necessary and 15 cc. of 10% $BaCl_2$ solution added to the filtrate. The solution is then warmed on the steam-bath and allowed to stand twenty-four hours before filtering. The precipitate is filtered off, washed thoroughly, ignited and weighed as $BaSO_4$. It is extremely important that the same reagents and the same amounts of each reagent be used in each set of analyses. This is due to the small sulphur contents of the reagents. Blank determinations on our method with different sets of reagents showed their sulphur content to vary from 0.0002–0.0258 Gm. of $BaSO_4$ per analysis.

TABLE III.—SULPHUR CONTENT OF CRUDE OIL.

	Wt. of oil, Gm.	Wt. of $BaSO_4$, Gm. (corr.).	Per cent S.
American (*a*)	2	0.0073	0.050
(*b*)	2	0.0083	0.057
Norwegian (*a*)	2	0.0070	0.048
(*b*)	2	0.0126	0.086

SULPHUR CONTENT OF DESTEARINATED OIL.

American, no.	Wt. of oil, Gm.	Wt. of $BaSO_4$, Gm. (corr.).	Per cent S.
1	2	0.0156	0.107
1	2	0.0125	0.086
2	2	0.0128	0.088
2	2	0.0163	0.112
3	2	0.0136	0.093
3	2	0.0126	0.087
4	2	0.0148	0.101
4	2	0.0130	0.089
5	2	0.0196	0.134
5	2	0.0174	0.119
6	2	0.0162	0.109

In order to check our sulphur method we added a known amount of sulphanilic acid to our oil and then determined the total sulphur content. The oil used was No. 6 above.

	Gm.		Gm.
Wt. of oil	2	Sulphur found	0.0064
Wt. of pure sulphanilic acid	0.0235	Sulphur calculated:	
Wt. of $BaSO_4$	0.0468	From cod liver oil	0.0022
		From sulphanilic acid	0.0039
		Total	0.0061

This shows that our method is determining the total sulphur content.

Our results indicate that sulphur is present in destearinated cod liver oil to the extent of 0.1% whereas the few results on undestearinated oil show only one half of this amount. We were not absolutely certain that the American destearinated and undestearinated represented identical oil samples. Assuming for the moment that they are identical the data would indicate that sulphur is picked up in the destearinating process. Such might be possible if the oil came in contact with rubber in any way. It is to be expected that the sulphur content will go up slightly in destearinating because the latter process removes a portion of the volume as stearine without diminishing the sulphur content. The latter per unit volume of destearinated oil will be slightly higher than in the case of undestearinated oil. To illustrate this some cod liver oil was destearinated in the laboratory, taking special precautions that it would come in contact with nothing which might introduce sulphur into it.

	Wt. of oil, Gm.	Wt. of $BaSO_4$ (corr.).	Per cent S.
Undestearinated	2	0.0071	0.049
Destearinated	2	0.0076	0.052

It is at once apparent that this lessening of the volume by removing the stearine does not account for the greater variation found in our former analyses. To investigate this matter further we obtained various oils from the cod liver oil rendering plants. The history of the oils obtained was thoroughly known, thereby increasing the value of the following results.

TABLE IV.

American Oil.

Oil.		Wt. of sample, Gm.	Wt. of $BaSO_4$, Gm. (corr.).	Per cent S.
283-A—Oil removed from No. 1 livers immediately	(*a*)	2	0.0127	0.087
	(*b*)	2	0.0092	0.063
283-B—Oil removed from No. 1 livers 12 hours or more later	(*a*)	2	0.0117	0.080
	(*b*)	2	0.158	0.108
283-D—Oil obtained by pressing after A and B were removed	(*a*)	2	0.0254	0.174
	(*b*)	2	0.0248	0.170
283-C—Oil removed from No. 2 livers (24 hours old)	(*a*)	2	0.0183	0.125
	(*b*)	2	0.0205	0.140

From our results on these two sets of oils we are led to believe that the variation in sulphur content of cod liver oils is due to the length of time which may exist before the oil is removed from the liver.

A second set of oils was obtained from a different source.

TABLE V.

American Oil.

Oil.	Wt. of oil, Gm.	Wt. of $BaSO_4$, Gm. (corr.).	Average per cent S.
Crude Oil	2	0.0053	
		0.0045	0.034
Skimmings	2	0.0052	
	2	0.0047	0.034
Pressed Chum	2	0.0120	
	2	0.0112	0.086
No. 2 Livers	2	0.0161	
	2	0.0162	0.110
Rotted Livers	2	0.0231	
	2	0.0187	0.143

SULPHIDE SULPHUR IN COD LIVER OIL.

Experiments were made to determine whether any of the sulphur present in cod liver oil was present as sulphide sulphur. J. H. Almy (26) developed a colorimetric method for the latter substance dependent upon the blue color obtained with *p*-amino-dimethyl-aniline-hydrochloride. Adapting this method to cod liver oil we were able to demonstrate that if sulphide sulphur was present in cod liver oil its concentration was less than 0.00004%. Seven different oil samples were analysed. To demonstrate that the method was applicable to cod liver oil provided sulphide sulphur were present, we added a known amount of sulphide sulphur to the oil and got colorimetric results comparable with our standards to the amount of S^- added.

SUMMARY.

A number of the physical and chemical characteristics of cod liver oil have been studied.

The peroxide content of cod liver oil has been examined and the applicability of a number of the known tests for peroxides has been tested.

The retardation of oxygen absorption of cod liver oil has been studied both qualitatively and quantitatively.

Cod liver oil has been found to contain 1.3 to 4.7 parts of iron per 10,000,000.

It has been shown that cod liver oil may contain from 0.03–0.2% sulphur.

Sulphur has been quantitatively found in both American and European oils.

The sulphur content of the oil appears to be dependent upon the length of time existing between the time when the fish is killed and the time when the oil is removed from the liver tissue.

The sulphur present in cod liver oil is not present as sulphide sulphur.

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STUDIES IN BIOASSAYS: "THE PROPOSED INTERNATIONAL STANDARD FOR DIGITALIS."*,[1]

BY CHARLES W. EDMUNDS, M.D.,[2] HAROLD W. LOVELL, A.B.,[3] AND SPENCER BRADEN.[3]

In U. S. Pharmacopœia IX biological assays were first adopted as an optional method of evaluating certain drugs for which chemical means were not available. In this group of drugs was the digitalis series including digitalis itself, strophanthus and squills. As a standard for these drugs, crystalline gratus-strophanthin or ouabain was adopted and the strength of each preparation was adjusted to a certain equivalent of ouabain as measured by its effect on frogs when tested by the prescribed method. Thus ouabain served as a check upon the frogs, the susceptibility of which to digitalis is known to vary at different seasons of the year.

During the years which followed the publication of this Pharmacopœia (IX), the standard ouabain apparently proved satisfactory because in the various discussions incident to the recent revision (X), no objection was made from any source to its continuance as a standard for the digitalis group, although it was suggested that a strophanthin isolated from Kombé seeds might be substituted for the *g*-strophanthin. This, however, was not done and ouabain was continued as the official standard.

On the other hand at the conference on Biological Standardization held in Edinburgh in 1923, it was recommended that a preparation of powdered digitalis leaves should be used as a standard for digitalis itself and that ouabain should be

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used as a standard for strophanthus. At the Geneva Conference, held in 1925, it was decided to use as a standard for digitalis a powder made by mixing ten different specimens of digitalis which had been dried at 55° to 60° C. the final mixture being carefully assayed by the cat method. The product was to be sealed in brown glass ampuls and distributed to different countries, thus serving as an international standard. Such a powder was prepared and distributed early in 1927, and it is this powder which served as the basis for the present study, the object of which was to ascertain its activity in relation to the present U. S. P. standard.

For a comparative study of the international powder, we used the U. S. P. ouabain and two specimens of powdered digitalis leaf which were obtained on the open market and which were said by the importers to be of German origin. The 1927 specimen was said to assay 110% U. S. P. standard, while the 1928 powder was presumably of U. S. P. strength.

In our study of the question, we utilized the same methods we had employed in our earlier work (which was recently published in THIS JOURNAL, 18 (1929), 338, *viz.*, the official frog method, the intravenous frog method, the 4-hour frog method and the cat method. The drugs were prepared for use in two forms. For the various frog methods we used tinctures which were prepared by taking equal weights of the international standard powder and of the laboratory powders and making tinctures of each as directed in the U. S. P. For the assays by the cat method, 0.5% infusions were prepared as directed by the Geneva Conference. The required amounts of powder and of water were heated for 15 minutes with constant stirring on a water-bath at a temperature of 90° C. The infusion was then filtered and sufficient water added to bring it to the original volume and sodium chloride to render it isotonic. The infusions thus prepared were cooled to body temperature and assayed in the manner described in the earlier paper. The ouabain was used in dilute solution in saline made by adding the required amount of stock solution of ouabain in 70% alcohol to physiological salt solution. The results of our assays are given in Table I.

TABLE I.—ASSAY OF THE PROPOSED INTERNATIONAL STANDARD POWDER OF DIGITALIS AND OF TWO COMMERCIAL POWDERS OF DIGITALIS IN COMPARISON WITH THE U. S. P. STANDARD OUABAIN.

	Methods and Ouabain Equivalents.			
	Official method.	Ouabain equivalent.	Intravenous frog method.	Ouabain equivalent. Mg.
Ouabain	0.00050 mg.		0.00035 mg.	
International powder as a tincture	0.0045 cc.	1 cc. = 0.11 mg.	0.0025 cc.	0.14
Laboratory powder (1927)	0.0045 cc.	1 cc. = 0.11 mg.	0.0030 cc.	0.117
Laboratory powder (1928)	0.0045 cc.	1 cc. = 0.11 mg.	0.0030 cc.	0.117

	4-hour frog method.	Ouabain equivalent. Mg.	Cat method mg. per Kg.	Ouabain equivalent 1 cc. tincture. Mg.
Ouabain	0.00040 mg.		0.103	
International powder	0.0045 cc.	0.089	83.7	0.123
Laboratory powder (1927)	0.0045 cc.	0.089	96.37	0.1068
Laboratory powder (1928)	0.0045 cc.	0.089	88.9	0.116

In order to make comparisons clearer the results given in Table I have been recalculated to show the ouabain value of one gram of each powder in relation to the international standard powder, the latter being considered as 100. These results are given in Table II.

TABLE II.—OUABAIN EQUIVALENTS (IN MILLIGRAMS) OF ONE GRAM OF EACH OF THE THREE DIGITALIS POWDERS.

	Methods.					Ratio.				
	Official	Intravenous.	4-hour.	Cat.	Average.	Official.	Intravenous.	4-hour.	Cat.	Average.
International powder	1.10	1.4	0.89	1.23	1.15	100	100	100	100	100
Lab. powder 1927	1.10	1.17	0.89	1.068	1.06	100	83	100	86	92
Lab. powder 1928	1.10	1.17	0.89	1.16	1.08	100	83	100	94	94

It is interesting to note in the tables that by the two methods requiring absorption (the 1-hour and the 4-hour frog methods) all three powders appear to be of the same strength but the 1-hour method gives a higher value than does the 4-hour method. However, it will be seen (Table I) that this difference in ouabain value is dependent upon the M. S. D. of ouabain itself, as the doses of the digitalis tinctures are the same in all cases, *viz.*, 0.0045 cc. no matter whether the period of observation was one hour or four hours. If it is true, as has been claimed, that one hour does not allow sufficient time for absorption of the active principles of the drug, the 4-hour method should show a higher value, but as a matter of fact it does not do so, and this fact is still further emphasized by the comparative study given later in this paper. Both intravenous methods (frog and cat) yield higher values than the methods requiring absorption. In this connection it is interesting to compare the curves of ouabain equivalents of the digitalis powders with the curves obtained with the strophanthus series. With digitalis the 4-hour frog curve is the lowest of all, while with strophanthus it is the highest. With strophanthus the cat method gave the lowest figures; with digitalis, on the other hand, it yielded high results. These differences are puzzling to explain. That the relative values are in general correct is probable as the curves are with only one or two exceptions parallel. It would seem that they must illustrate again the inherent differences between the two drugs when the question of absorbability is concerned.

With the data available it is interesting to compare the strength of the international powder with the present U. S. P. standard. This standard for digitalis requires that 0.006 cc. of the tincture shall be equivalent to 0.0005 mg. of ouabain or in other words, that 1 Gm. of digitalis shall equal 0.833 mg. of ouabain when tested by the official frog lymph sac method. One gram of the international standard powder, however, equals 1.1 mg. ouabain, when tested by the official method, and it is therefore about 130% of the U. S. Standard. This figure we believe may be accepted as being approximately correct, as the M. S. D. for the powder and for the ouabain standard were ascertained in 1927 and both were verified by another worker (B) a year later, using in the case of the digitalis powder ampuls from an entirely new supply of the standard kindly forwarded for the work by Dr. H. H. Dale.

This value is further confirmed by the fact that the international powder was assayed by the cat method in 1926 in the laboratory of the late Professor Magnus at the University of Utrecht, and as a result of 23 determinations it was reported to have a fatal dose of 89.7 mg. per Kg. cat, an ouabain equivalent of 1.115 mg. per Gm. of powder. Our assays carried out in December 1927, gave a toxicity for cats of 83.7 mg. per Kg., or an ouabain value of 1.23 mg. per Gm. of powder, a difference of only 0.12 mg. (or 10 per cent) per Gm. of powder between the two

findings. This difference could doubtless be reduced had a larger number of cats been employed. An average of these two figures yields a value of 86.7 mg. per Kg. of cat weight. Hatcher considers 100 mg. per Kg. of cat to be about the average value for U. S. P. tincture of digitalis. Based upon these "average" figures the value of the international standard powder would be 116% U. S. P. or 119% U. S. P. if the calculation is based upon our figures alone. These figures form an interesting comparison and confirmation of the value 130% found by the official frog method.

While our results agree so closely with the Utrecht figures, those obtained by Burn and his co-workers differ considerably, as they report that they found that 1 cc. of the tincture made from the international powder was equivalent to only 0.804 mg. U. S. P. ouabain. The average value obtained by Magnus and by ourselves for the digitalis powder was 1.17 mg. ouabain as against a value of 0.804 mg. found by the English workers, a difference of 0.366 mg. ouabain per Gm. of powder, or 32%. This surprising discrepancy is doubtless to be explained by the Burn method of carrying out the assay, reference to which has been made in the earlier sections of this paper. This variation in technique in carrying out the assay by the cat method has given the English workers a value for U. S. P. ouabain of 0.06115 mg. as compared with the Hatcher figures of 0.1 mg. and our value of 0.103 mg.

The 1927 commercial specimen of digitalis powder obtained direct from the importer was accompanied by a statement of assay made according to the official method, using 9 frogs for the digitalis and 8 for the ouabain control. In spite of the small number of frogs employed, an activity of 110% of the U. S. standard was reported. This figure compares very favorably with the results of our assay of this powder by the official method, giving it an activity of about 120% of the U. S. standard. The 1928 powder appeared to be slightly stronger than the 1927 product, but both are about 8% weaker than the proposed international standard. (See Table II.)

The fact that the powder proposed as an international standard has a value somewhere about 130% of the U. S. standard is of considerable interest and importance. That it is not a powder of exceptional strength is shown by the fact that it is a mixture from ten different specimens, four of these being from the 1923 crop, the other six being collected in 1925. Four specimens were from German sources, two from Holland, one from Belgium, two from the United States and one from Canada. It was therefore an "average" powder, and yet it is considerably stronger than the U. S. standard. Possibly this standard is too low. It is certainly true that it is very common to get a digitalis powder of a potency considerably above this figure. Our experience coincides with that of one of the manufacturers who writes that they not infrequently get digitalis leaves of double U. S. P. strength. We have assayed leaves gathered in Oregon which had more than twice the activity of the U. S. P. standard. Leaves from plants raised in the fields near Ann Arbor have shown even higher activity.

It is certainly true that the activity of this powder which is proposed as an international standard will, when the next revision of the Pharmacopœia is undertaken, naturally bring up the question as to whether the U. S. standard should not be raised. *Apropos* of the same question, may we not find here perhaps one

explanation of the demand of the older practitioners for powdered digitalis of English or German origin? With the present careful selection of the crude drug and wide use of standardized preparations together with large dosage, the demand is not so frequently heard to-day.

DISCUSSION.

A comparative study of the data which we have obtained in the course of our assays is of considerable interest, shedding as it does some light upon the problem of absorption—a matter which is of fundamental importance in certain of the assay methods. In order to simplify the figures and eliminate individual variations, we have refigured our results in the cases where the data is complete on a ratio basis, using the frog intravenous doses as 100, choosing these as a basis of comparison because with them the question of absorption does not arise as it does in the other frog methods. The results are shown in Table III.

TABLE III.—RELATIVE DOSAGE OBTAINED BY THE DIFFERENT METHODS OF ASSAY USING FROGS.

	Results of Assays.			Ratio.		
	Intravenous.	4-hour.	1-hour.	Intravenous.	4-hour.	1-hour.
Ouabains.						
U. S. Standard[1]	35[1]	35	45	100	100	128
Merck-10182, Old Standard	35	35	45	100	100	128
Merck-186450	35	35	50	100	100	143
Brauns-Closson	35	40	50	100	114	143
Merck-10977	35	35	45	100	100	128
Merck-21974		35				
				—	—	—
		Average		100	103	134
Strophanthins.						
Schuchardt	65	60	100	100		154
Abbott	65	70	100	100	108	154
Merck-28427	65	60	100	100		154
				—	—	—
		Average		100	108	154
Tincture Strophanthus.						
Tincture 1	60	65	105	100	108	175
Tincture 2	50	55	100	100	110	200
				—	—	—
		Average		100	109	188
Tincture Digitalis.						
Laboratory powder (1927)	30	45	45	100	150	150
Laboratory powder (1928)	30	45	45	100	150	150
International powder	25	45	45	100	180	180
				—	—	—
		Average		100	160	160

[1] The figures on Ouabain and Strophanthin have all been taken from Section One of this study (THIS JOURNAL, XVIII (1929), 338); while figures on the Tincture of Strophanthus are from Section Two (THIS JOURNAL, XVIII (1929), 568). For the sake of brevity and simplicity in giving the doses the ciphers and decimal point are dropped. Thus, "35" means a dose of 0.00035 mg. per Gm. of frog; "65" equal 0.00065 mg. per Gm. of frog, etc.

Inasmuch as the individual differences in results are not completely eliminated and they would obscure the general picture, it would seem profitable for the present study to discuss average results only. As the table shows, the

relative doses for the ouabains, for the strophanthins, and for the tinctures of strophanthus agree in that a dose less than 10% larger is necessary to kill by the 4-hour method than by the intravenous method. The total active principle must, therefore, have been absorbed in this 4-hour period and the slightly larger dose is necessary because the drug reaches the heart more slowly. The fate of the tincture of strophanthus is in complete agreement with that of the active principles in that only 9% more is necessary to kill in the 4-hour period than in 1-hour when drug is given intravenously.

By the 1-hour frog method both gratus and Kombé strophanthins require a dose from a third to one-half larger than when given by the intravenous route. This fact is shown quite clearly when the ratio averages are thus studied, and its correctness would seem to be definitely established by the complete agreement between the figures of the individual preparations.

Tincture of strophanthus, however, is apparently very slowly absorbed from the lymph sac, as almost double the dose is needed to kill in one hour when it is given by the lymph sac as when it is given by the intravenous route. It is evident that absorption of strophanthus is far from complete in one hour, but that fact does not in the least interfere with the value of the method for the assay of this tincture provided the absorption of different tinctures is a fairly uniform process. The fate of these two tinctures would seem to indicate that that was a fact but the exact ratio of the 1-hour lymph sac dose to the intravenous dose would need to be established by the examination of a larger number of specimens. Especially is this true as those studied here are the two which were discussed in an earlier section of this paper as displaying an erratic relationship to the other methods of assay. That there was some peculiarity about these two tinctures—doubtless connected in some way with their mode of manufacture—which interfered with their absorption from the frog's lymph sac is shown also by a study of the relationship of the 1-hour dose to the 4-hour dose. (Unfortunately we had figures by the intravenous method on only these two tinctures, XV and XVI, so we could not compare them by this method with the remaining tinctures. However, we had found on these two tinctures that the intravenous route and the 4-hour method gave practically identical figures so that an indirect comparison is possible.) For a comparison of the 4-hour and the 1-hour method, the figures and calculated ratios are given in Table IV.

TABLE IV.—RATIOS OF 1-HOUR DOSE TO 4-HOUR DOSE FOR FIVE TINCTURES OF STROPHANTHUS.

Tincture.	4-hour method cc. per Gm. of frog.	1-hour method cc. per Gm. of frog.	Ratios. 4-hour.	Ratios. 1-hour.	Average.
XV	0.065	0.105	100	162	
XVI	0.055	0.100	100	182	172
XVII	0.050	0.070	100	140	
XVIII	0.100	0.130	100	130	
XIX	0.065	0.100		154	141

These figures again clearly show the difference in behavior between Tinctures XV and XVI and the others of the group. While the latter tinctures require a dose only 40% larger by the 1-hour method than they do by the 4-hour period of

observation, the first two require a dose 72% larger. That this is not accidental is shown by the fact that the figures are so clear cut and have appeared earlier in different relationships. Absorption, however, slow as it is, is complete by the fourth hour and is fairly uniform for different tinctures, as is shown by the individual figures. It would seem that this feature of slow absorption from the lymph sac of the frog as shown by these tinctures is another example of the same difficulty which is exhibited by the strophanthus preparations when they are given by mouth to the higher animals.

The digitalis tinctures differ considerably from the strophanthus tinctures in details of absorption (Table III), although they require, as is to be expected, a larger dose by both lymph sac methods than by the intravenous route. Absorption, however, is apparently as complete in one hour as in four, as the ratio of dosage is the same for four hours as it is for one hour. These results are in interesting contrast to those obtained with strophanthus and they emphasize the relative ease of digitalis absorption as compared with strophanthus. It must be remembered that only three tinctures are being considered and these relations might be altered were a larger number of digitalis powders examined. This criticism or warning is offset somewhat by the fact to which attention was called earlier, *viz.*, that these assays were carried out very carefully by two different workers in two different years and in the rare cases when slightly discordant results were obtained which could not be reconciled by repeated assays, an average of the results was taken. We feel, therefore, that the figures and conclusions drawn therefrom are entitled to considerable respect.

CONCLUSIONS.

The powdered digitalis which is proposed as an International standard is about 30% stronger than the U. S. P. X standard.

With the strophanthins and with the tinctures of strophanthus, a dose 10% larger is necessary to cause systolic standstill of the frog's heart in four hours when it is given into the lymph sac than when the drug is given intravenously and one hour allowed for observation.

A dose of the strophanthins 40–50% larger is required in the 1-hour lymph sac method than in the 1-hour intravenous method.

For tinctures of strophanthus the dose when it is given into the lymph sac and one hour allowed for observation, must be almost double the intravenous dose.

For tinctures of digitalis, the dose, whether for a 1-hour or for a 4-hour period of observation, must be about 65% above the intravenous dose, indicating greater ease of absorption of digitalis from the lymph sac as compared with strophanthus, as absorption is practically complete in one hour.

ORGANIC ADDITION COMPOUNDS OF CALCIUM CHLORIDE AND CALCIUM IODIDE.*

BY FREDERICK R. GREENBAUM.

It is a well-established fact, that calcium chloride forms a number of addition compounds with organic substances. Thus ethyl alcohol and methyl alcohol

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form addition compounds with calcium chloride in which the water of crystallization of calcium chloride is replaced by ethyl or methyl alcohol. For this reason calcium chloride cannot be used to dehydrate ethyl alcohol.

Another addition compound of calcium chloride is catechol calcium chloride of the following composition: $Ca\ Cl_2.3C_6H_4\ (OH)_2$ described by F. R. Weinland and Wilhelm Denzel (1) and triglycerin calcium chloride of the formula: $CaCl_2.3C_3H_5\ (OH)_3$ described by A. Grün and T. Husman (2).

Another addition compound described in the literature is calcium chloride thiourea, $CaCl_2(CS(NH_2)_2)_6$, which was studied by A. Rosenheim and V. J. Meyer (5). Calcium chloride tetraacetamide, and calcium chloride dihydrazine are also described in the literature (3) (4).

The calcium chloride urea was the first of these addition compounds to find therapeutic application. This compound of the composition of $CaCl_2.4CO(NH_2)_2$ is patented (6) and marketed under the name of "Afenil." "Afenil" is used whereever calcium chloride is indicated; its toxic properties being less than that of calcium chloride.

According to the patent, calcium-chloride urea is prepared by dissolving urea in ethyl or methyl alcohol and dissolving calcium chloride in the solvent. These solutions are then poured together and the ethyl or methyl alcohol evaporated until crystallization takes place.

During this investigation, a number of calcium chloride addition compounds were prepared for therapeutic use with the thought of detoxicating calcium chloride. The method described in the "Afenil" patent was used. Compounds similar to urea were selected until finally it was observed that calcium chloride combines with most of the basic substances, that have the same solubility properties. It was also noticed that each organic compound in combination with calcium chloride, also reacted with calcium iodide. Calcium iodide, therefore, was also included in this investigation. A point of interest noted was, that calcium chloride combines with two or four molecules of the organic substance, while calcium iodide usually combines with six molecules. The following addition compounds of $CaCl_2$ and CaI_2 were prepared:

Calcium chloride thiourea: $CaCl_2.4CS(NH_2)_2$

Calcium chloride hexamethylenetetramine, $CaCl_2.2C_6H_{12}N_4.3H_2O$

Calcium chloride thiosinamine, $CaCl_24.CS(NH_2)(NH{-}CH_2{-}CH{=}CH_2)$

Calcium chloride urethane, $CaCl_2.4CO(NH_2)(O{-}C_2H_5).2H_2O$

Calcium chloride antipyrine, $CaCl_2.4CH_3{-}C(=CH{-}CO)({-}N(C_6H_5){-}N<)$

Calcium chloride acetylurea, acetylafenil, $CaCl_2.4CO(NH_2)(NHCOCH_3)$

Calcium chloride acetylthiourea, $CaCl_2.4CS(NH_2)(NHCOCH_3)$

Calcium chloride monophenylurea, $CaCl_2.4CO(NH_2)(NHC_6H_5)$

From the calcium iodide compounds the following were prepared:

Calcium iodo urea, manufactured in Germany and also called "Iodofortan" (8) of the following formulas: $CaI_2.6CS(NH_2)_2$

Calcium iodo thiourea, prepared in analogy to "Iodofortan," $CaI_2.6CS(NH_2)_2$

Calcium iodo hexamethylenetetramine, $CaI_2.2C_6H_{12}N_4$

Calcium iodothiosinamin, $CaI_2.4CO\begin{matrix}NH_2\\NH-CH_2-CH=CH_2\end{matrix}$

Calcium iodo urethane, $CaI_2.6CO\begin{matrix}NH_2\\OC_2H_5\end{matrix}$

Calcium iodo antipyrene, $CaI_2.6CH_3-C(=CH-CO)-N(-C_6H_5)-N$ (CH$_3$ on C)

Calcium iodo monoacetylurea, $CaI_2.6CO\begin{matrix}NH_2\\NHCOCH_3\end{matrix}$

Calcium iodomonoacetylthiourea, $CaI_2.6CS\begin{matrix}NH_2\\NHCOCH_3\end{matrix}$

and Calcium iodomonophenylurea, $CaI_2.6CO\begin{matrix}NH_2\\NHC_6H_5\end{matrix}$

EXPERIMENTAL PART.

"Afenil," calcium chloride urea was prepared according to the German Patent previously mentioned (6).

From Aqueous Solution.—12 Gm. of urea were dissolved in 20 cc. of water and 5.5 Gm. of anhydrous calcium chloride dissolved in 20 cc. of water. These two solutions were mixed and heated to the boiling for about half an hour, then boiled until the volume was very small. On cooling white crystals, rhombic prisms were obtained.

From Methyl Alcoholic Solution.—12 Gm. of urea dissolved in 50 cc. of hot methyl alcohol and 5.5 Gm. of anhydrous calcium chloride dissolved in 150 cc. of hot methyl alcohol, the two solutions mixed and then the alcohol was distilled off until the compound began to crystallize. The addition of ether will cause precipitation. A white somewhat hygroscopic powder was obtained, with a melting point of 158–160° C. Analysis for calcium chloride urea gave for calcium 11.3%, 11.7% calculated for calcium 11.4%. It is easily soluble in water and in dilute alcohol; insoluble in absolute or 96% alcohol.

Calcium Chloride Thiourea.—15 Gm. of thiourea were dissolved in hot methyl alcohol and 5.5 Gm. of calcium chloride were dissolved in hot methyl alcohol; the two solutions mixed and the alcohol removed to a very small volume and then precipitated with ether. It is a white crystalline, homogeneous substance, monocline prisms, melting point 175–177° C. very readily soluble in water and alcohol, insoluble in ether. Slightly soluble in acetone. Analysis gave

Calcium calculated:	9.7 %
Calcium found:	8.5 %
Nitrogen calculated:	27.05%
Nitrogen found:	27.60%

Although the compound was described in the literature (5) the calcium chloride thiourea obtained in this investigation was different in composition from the one previously described by A. Rosenheim and V. Meyer.

Calcium Chloride Hexamethylenetetramine.—This compound was described in the literature (7) and was prepared accordingly, resulting in white crystals, very soluble in water, soluble in absolute alcohol, insoluble in ether and acetone. Analysis for

Nitrogen calculated:	25.7 %
Nitrogen found:	25.78%

Calcium Chloride Thiosinamine.—In the preparation 23 Gm. of thiosinamine and 55 Gm. of anhydrous calcium chloride were dissolved in hot methyl alcohol. The methyl alcohol was removed by heating on a water-bath, the remaining fluid crystallized in the cold. A white crystalline powder was obtained, very soluble in water and methyl alcohol, insoluble in absolute ethyl alcohol and acetone. Melts at 75° C.

Analysis:	Nitrogen calculated:	17.8 %
	Nitrogen found:	17.3 %

Calcium Chloride Urethane.—This was prepared for the first time in the same way as all the other compounds. White crystals soluble in water, insoluble in acetone and ether, soluble in alcohol.

Analysis:	Nitrogen calculated:	21.8 %
	Nitrogen found:	22.3 %
	Calcium calculated:	4.6 %
	Calcium found:	4.5 %

Calcium Chloride Acetylurea, Acetylafenil.—Prepared for the first time from 20.4 Gm. of acetyl urea and 5.5 Gm. of calcium chloride, resulting in white crystals melting at 135–140° C. Slightly soluble in cold water, soluble in hot water, hot methyl and ethyl alcohol, insoluble in ether.

Analysis:	Nitrogen calculated:	21.8 %
	Nitrogen found:	22.3 %
	Calcium calculated:	7.7 %
	Calcium found:	7.8 %

Calcium Chloride Acetylthiourea.—5.5 Gm. of anhydrous calcium chloride and 23.2 Gm. of monoacetylthiourea were dissolved in hot methylalcohol, the methyl alcohol removed by distillation until crystallization takes place.

Analysis:	Nitrogen calculated:	19.24%
	Nitrogen found:	20.03%, 18.55%, 18.26%

It represented a white, somewhat hygroscopic powder, soluble in cold and hot water, soluble in methyl alcohol and ethyl alcohol, insoluble in ether.

Finally from the calcium chloride series, calcium chloride monophenyl urea was prepared as follows:

2.75 Gm. of anhydrous calcium chloride was dissolved in hot methyl alcohol and 13.6 Gm. of monophenyl urea in hot methyl alcohol; the alcohol was removed by distillation until crystallization took place. A white crystalline substance, which was insoluble in cold water, soluble in boiling water, soluble in methyl and ethyl alcohol and in soluble in ether, was obtained.

The analysis gave:	Nitrogen calculated:	15.4 %
	Nitrogen found:	15.2 %
	Calcium calculated:	5.5 %
	Not determined:	——

From the calcium iodide the following addition compounds were prepared

Calcium Iodo Urea.—This compound is manufactured in Germany (8) under the name of "Iodofortan" by the Chemische Fabrik Arthur Jaffe, Berlin and was prepared from 7.3 Gm. of calcium iodide and 9 Gm. urea. It yielded a white, slightly hygroscopic substance, melting point 95° C. and is very soluble in cold and hot water, methyl alcohol and ethyl alcohol.

Nitrogen calculated:	25.7 %
Nitrogen found:	26.2 %
Calcium calculated:	6.1 %
Calcium found:	7.5 %

The compound absorbed moisture, which accounts for the poor analytical results. In analogy with calcium iodourea, calcium iodo thiourea was prepared for the first time.

Calcium Iodo Thiourea.—This was prepared from 7.35 Gm. of calcium iodide 11.4 Gm. of thiourea.

Analysis:		
	Nitrogen calculated:	22.4 %
	Nitrogen found:	21.5 %
	Calcium calculated:	5.3 %
	Calcium found:	4.3 %

It is a white and stable substance, very soluble in water, in methyl and ethyl alcohol, containing about 34% of iodine. Its elimination in regard to iodine was studied by F. R. Greenbaum and G. W. Raiziss (9).

Calcium Iodo Hexamethyleneamine.—This is manufactured in Germany under the name of "Hexamine," prepared from 7.35 Gm. of calcium iodide and 7 Gm. of hexamethyleneamine. It gave a nice white stable substance, not hygroscopic readily soluble in water and in hot methyl alcohol, insoluble in absolute alcohol, acetone and ether. Melting point 180°C.

Analysis:		
	Nitrogen calculated:	19.5 %
	Nitrogen found:	18.4 %
	Calcium calculated:	6 9 %
	Calcium found:	5.3 %

The compound was apparently still moist or had absorbed moisture when analyzed.

Calcium Iodo Thiosinamine.—This is prepared from 7.3 Gm. of calcium iodide and 24 Gm. of thiosinamine, dissolved in methyl alcohol and evaporated to dryness. It is fluid at 90° C. but crystallizes on cooling. White crystals, soluble in water, insoluble in alcohol, ether and acetone.

Analysis:		
	Nitrogen calculated:	16.8 %
	Nitrogen found:	17.2 %
	Calcium calculated:	4.0 %
	Calcium found:	4.5 %

Calcium Iodo Urethane.—Obtained from calcium iodide and urethane. 13.35 Gm. of urethane and 7.3 Gm. of calcium iodide were dissolved in methyl alcohol and the methyl alcohol was distilled off. Yellow crystals, stable on air, soluble in water and methyl alcohol, insoluble in absolute alcohol and ether.

Analysis:		
	Nitrogen calculated:	10.1 %
	Nitrogen found:	9.4 %
	Calcium calculated:	4.8 %
	Calcium found:	4.5 %

Calcium Iodo Antipyrene.—Prepared from 7.35 Gm. of calcium iodide and 21.2 Gm. of antipyrene; it yielded white crystals, soluble in water and methyl alcohol, insoluble in ether.

Analysis:		
	Nitrogen calculated:	11.3 %
	Nitrogen found:	10.18%, 10.2%
	Calcium calculated:	2.7 %
	Calcium found:	2.9 %

Calcium Iodo Monoacetyl Thiourea.—4.5 Gm. of monoacetyl thiourea and 1.8 Gm. of calcium iodide were dissolved in hot methyl alcohol and then the alcohol evaporated. White powder slightly soluble in cold water, soluble in hot water, soluble in ethyl and methyl alcohol, insoluble in ether.

Analysis:	Nitrogen calculated:	16.7 %
	Nitrogen found:	15.5 %
	Calcium calculated:	3.9 %
	Calcium found:	2.4 %

Calcium Iodo Acetyl Urea was prepared from 14.7 Gm. of calcium iodide and 30.6 Gm. of acetyl urea. Slightly soluble in cold water, more soluble in warm water, soluble in ethyl and methyl alcohol, insoluble in ether.

Analysis:	Nitrogen calculated for nitrogen:	18.6 %
	Nitrogen found:	18.9 %

Calcium Iodo Monophenyl Urea was prepared from 17 Gm. of monophenylurea and 6.2 Gm. of calcium iodide, dissolved in methyl alcohol and the alcohol was removed by distillation and ether added.

Analysis:	Nitrogen calculated:	15.13%
	Nitrogen found:	15.89%

It represents a white crystalline substance, insoluble in cold water and soluble in hot and boiling water, in methyl alcohol and ethyl alcohol and insoluble in ether.

It was attempted to use phenyl-acetyl-urea of the formula: $CO\begin{matrix}/NHCOCH_3\\ \backslash NHC_6H_5\end{matrix}$, and it was found that this compound does not form an addition product with either calcium chloride or calcium iodide.

CONCLUSIONS.

1. Calcium chloride and calcium iodide form addition products with organic compounds of a pronounced basic nature, whereby in the case of calcium chloride usually four molecules of the organic base enter into the addition combination; in the case of calcium iodide six molecules of the organic compound enter into this combination.

2. Calcium chloride and calcium iodide form addition compounds with urea and thiourea derivatives, as long as both amino groups or at least one of the amino group is not substituted.

3. These addition compounds are stable, less hygroscopic than calcium chloride and calcium iodide, with a definite crystalline shape and are only formed, when the calcium chloride as well as the organic compounds are easily soluble in the same solvents.

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SOME OBSERVATIONS ON MEDICINAL PLANTS OF FLORIDA.*

BY B. V. CHRISTENSEN.[1]

Nature has been generous to Florida. Several eminent botanists who have studied and written regarding the plant life of this state have remarked that in no other state of the Union do we find the large number of plant families with the large representation of genii and species that occur in Florida. Probably in no other state do we find as great a range in native plant life, inasmuch as in this state are found representatives of tropical, subtropical and temperate plant types. Furthermore, many plants which are native to the northern states will not only grow but will thrive in Florida while, on the other hand, many of the plants native to Florida cannot be grown under the climatic conditions existing further north. Dr. Pammel of the University of Iowa remarks that not only is the plant life of Florida important from the standpoint of number of species, but also from the standpoint of interest in regard to the peculiar life history and methods of struggling for existence, and as an example he cites the strangling fig.

The unusual plant life in Florida is due in part to the fact that the state extends through approximately six degrees of latitude, which give it tropical, subtropical and temperate climatic features; in part also to the fact that it extends through approximately seven degrees of longitude which make possible a great variety in soil conditions and physiographic features; third, to its peculiar location in relation to other land bodies and to bodies of water.

The effect of a wide range of latitude is too evident to require elaboration. With reference to soil conditions and physiographic features it might be interesting to note that the peninsular part of the state consists primarily of a lime rock formation, called Miami oolite, which in the lower part has not yet been sufficiently weathered nor has it yet borne vegetation sufficient to form a layer of soil of any appreciable depth, except in strips called hammocks. It might be interesting to note here also that the fruit growers, in planting the trees, first blast out a hole a foot or so in diameter and two or three feet deep for the tap root of the tree, and pulverize with a pickax a shallower area for the secondary roots. Farther north is a continuation of the Everglade region. This consists of underlying rock covered with a layer of muck formed from decayed plants. This is a vast prairie, broken by hammocks, and during the rainy season much of this area is under water. Still farther north is the sandy area and to the westward, in the region of Tallahassee, are found the clay hills. This probably is sufficient to illustrate the variation in soil and physiography.

With respect to the third factor influencing the plant life of Florida, namely, its peculiar location with reference to land and water bodies, Paradise Key might serve as an interesting example. Paradise Key is an island in the Everglades; it is one of the so-called hammocks, but is peculiar in that it is completely surrounded by a flooded area. Dr. Thompson, a retired botanist now living in Miami, advances the interesting theory that at one time a great tidal wave submerged the

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lower part of Florida, bringing with it seeds and plants from the tropical islands, particularly Porto Rico. With the receding of this tidal wave these seeds and plants were deposited and formed the beginnings of tropical plant life for this region. However, due to destructive fires, clearing of forests, etc., this tropical plant life was destroyed in all parts except Paradise Key, where, due to its isolation, it remains undisturbed. W. E. Safford, former economic botanist, U. S. Department of Agriculture, summarizes the situation very aptly in the following words:

"Paradise Key, an island in the heart of the Everglades of Florida, is almost unique from a biological point of view, presenting as it does a remarkable example of a subtropical jungle within the limits of the United States in which primeval conditions of animal and plant life have remained unchanged by man, and thus offering a striking contrast to the keys along the coast of Florida as well as to other Everglade keys in which normal biological conditions have been greatly disturbed by destructive fires, clearing of forests, or the construction of drainage canals, which not only affect the original physical conditions, but at the same time permit aquatic animals and plants previously unknown to penetrate into the Everglades. The region is also remarkable for the fact that it is a meeting place for many temperate and tropical types of plants and animals."
"Paradise Key owes its preservation from fires and other destructive agencies chiefly to its isolation and to a deep slough near its eastward border which never becomes dry, even during periods of greatest drought."

It will not be possible within the limits of this paper to list all of the medicinal plants occurring in Florida. However, it might be advisable to mention a few, particularly with reference to the three influences discussed above. Along the borders of Paradise Key are found a number of marsh-loving shrubs, such as Wax Myrtle, from the root of which bayberry bark is obtained, and the Swamp Bay with an aromatic fragrance like that of bay rum. Among the plants of tropical origin found on Paradise Key, Bitterwood, Guaiac and Sarsaparilla may be mentioned as illustrations. In the Everglades outside of Paradise Key, Poke Root grows to an enormous size. Here also are found Black Mustard, Jimson Weed, Mandrake, Castor Bean, Snake Root and Cassia Cinnamon. American Storax is found quite generally distributed over the state but more particularly in the northern half. The medicinal pines, *Pinus palustris* and *P. taeda*, are most extensive in the sandy areas, Gainesville being approximately in the geographical center of the pine region. In this same region the Prickly Ash is found, also Witch Hazel, Stillingia, Sumac, Gelsemium and Saw Palmetto. In the western part of the state some of the most interesting, if not the most important, medicinal plants are found, such as, Fringe Tree, Seven-Barks and Dioscorea, as well as *Betula lenta* and *Prunus serotina*.

The collection of native botanical drugs for the market is now receiving considerable attention in this state. This work is done in some cases by itinerant collectors; in other instances it is followed as a sort of pin-money proposition by farmers, truck-growers and country storekeepers and in a few cases the collection of medicinal plants is the major occupation and is depended upon as a means of livelihood and family support. If we could consider the pine products as purely medicinal this latter group would be enormously increased. It appears that the medicinal demand for these products is nevertheless great enough to warrant their consideration in this connection. That this viewpoint is justifiable is supported by a recent statement of Carl Speh, Secretary of the Pine Institute of America, Jacksonville, to the effect that if the old custom of keeping a bottle of turpen-

tine in every home for medicinal use were to be revived the turpentine producers would have little occasion to worry about marketing this product. For the past twenty odd years, Florida has been the largest producer of turpentine and rosin in this country. From 1905 up to the time of the World War, Florida produced approximately 45% of the turpentine of the United States, with a maximum of 54%, in 1910. Since the War, Florida's proportion has dropped and Georgia appears to be forging to the front. The total value of the naval stores' crop in 1925 was above 12 million dollars and furnished support for 60,000 people. In the December 15, 1926 issue of the *Southern Lumber Journal*, O. H. L. Wernicke, President of the Pine Institute of America, states:

"Recent research carried on by the Pine Institute of America indicates that the markets and products of this industry are but in their infancy, because their possibilities have been barely scratched. Turpentine and rosin are only the simplest and crudest of the products which will be obtained from oleoresin (the gum of the pine trees). New products, which mean new industrial establishments, are being devised, which start with oleoresin as a base, much as crude petroleum is the base for great varieties of products which touch our lives at every angle."

Other important drugs from the standpoint of collection are Saw Palmetto berries and Stillingia root. Saw Palmetto is quite generally distributed throughout the state, but it is claimed that the berries produced within four or five miles of the sea-coast are better than those produced further inland. They are better from the standpoint of general appearance, uniformity in size and yield, and hence, most of the collecting is done along the Middle Atlantic Coast of the state. It is estimated that the annual demand for Saw Palmetto berries is in the neighborhood of 200,000 lbs.

Stillingia root is collected primarily in Putnam and Marion Counties and in the northern region of the Indian River. Some of this is sold to American pharmaceutical manufacturers but it appears that most of the growers sell directly to exporters. No estimate as to the amount collected annually has been obtained.

Other drugs collected are Blue Flag root, Deer Tongue and Water Eryngo. Deer Tongue is used for the production of coumarin, and Water Eryngo or Button Snakeroot has been used as a substitute for Senega. No estimate has been obtained regarding the quantity of these drugs collected.

The cultivation of medicinal plants in this country is a comparatively recent innovation and is still only in its earliest infancy from the standpoint of development. This may be attributed to the fact that natural supplies have been sufficient to meet the demand and could be placed on the market more cheaply than the cultivated product; secondly, to the fact that it is financially impossible to compete with the cheap labor of foreign countries. However, due to destructive methods of harvesting and the spread of agriculture and other industries which require clearing of the land, the natural supplies in some cases are being rapidly depleted and undoubtedly the time is not far distant when it will be necessary to resort to cultivation to supply the demand for many crude drugs. Cultivation of medicinal plants is also being stimulated by the operation of drug plant gardens and the introduction of courses in the cultivation of medicinal plants by Colleges of Pharmacy, thus making it possible for students to secure training in the fundamentals of medicinal plant production. Interest in the possibility of successfully raising drug plants for market is growing yearly. This interest is evident in the

State of Florida and is manifested by the large number of inquiries concerning drug cultivation received by the College of Pharmacy.

There are a few successful growers in this state, but this industry is only a side-line and has not yet developed to the point where it is made a major business. It has been already demonstrated that there are a large number of drug plants that will grow in Florida but it remains to be determined whether or not these can be grown profitably; but the number of plants suitable for profitable cultivation is probably relatively small. This is due in part to the fact that the demand for many of them is small and irregular and consequently the market is unstable and spasmodic.

Several essential oil-bearing plants flourish as weeds in this state, and also grow well under cultivation. Among such plants are American Wormseed and *Monarda punctata* (Horse Mint). Peppermint and Spearmint also grow well and there is a possibility that the commercial production of these plants could be made a profitable industry. There are already several growers of peppermint in Florida, a few of whom are extending their acreage as rapidly as possible.

Many crude drugs are derived from plants which thrive in the Tropics or Subtropics and these undoubtedly offer a possibility to Florida. One individual is now embarking on this venture and is planning to experiment with such drugs as Aloes, Jalap, Assafœtida and Squill. Experimentation with the growing of camphor trees on a large scale has already been carried on in this state. The results indicated that the cost of producing camphor gum is necessarily high and that under present conditions, production of camphor under cultivation is not feasible.

Florida offers great possibilities from the standpoint of scientific investigation of medicinal plant resources. It is said that at present about 600 crude drugs are used in the preparation of medicines in the United States. It is now known that about 20% of this number occur in this state and it has been demonstrated that an additional 20% will grow in Florida. There is no doubt but that this percentage will be shown by further investigation to be considerably higher. However, it appears not only possible but probable that there may be a variation in percentage of constituents as well as character of constituents of plants grown under Florida conditions when compared with the same species of plants grown under conditions existing in other localities, and in this connection there is undoubtedly a fruitful field for scientific plant investigation. Furthermore, there are undoubtedly plants in this state possessing important medicinal qualities, possibly surpassing those of plants now in use. The College of Pharmacy, University of Florida, has during the past year received several letters describing medicinal virtues of plants heretofore not known to possess such qualities. Here again is a fruitful field for investigation. Who knows but that within the borders of Florida may be a Chinese Ma Huang, a Cinchona or a Cassia Senna waiting to be discovered by some ambitious and budding pharmacist.

Rapid City Convention, August 19th–31st: The Plant Science Seminar, the National Conference on Pharmaceutical Research, the AMERICAN PHARMACEUTICAL ASSOCIATION, the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, the Conference of Pharmaceutical Secretaries, a Symposium on the Genus Mentha, a Conference of Pharmacy Law Enforcement Officials.

THE CAUSE OF IRRITATION OF 8-HYDROXY QUINOLINE COMPOUNDS. ONE EFFECT OF p_H CAUSED BY ACID MOLECULE.*

BY R. VAN WINKLE AND W. G. CHRISTIANSEN.

8-Hydroxy quinoline compounds have been shown to exert a strong antispetic action. Their use as an antiseptic, has been restricted due to the accompanying irritation to the mucous membrane which they cause. The latter is not uniformly noticed inasmuch as some individuals are highly susceptible to this irritation while others are almost entirely immune to it. The following work was carried out in order to determine whether the acid molecule attached to the 8-hydroxy quinoline nucleus bore any relation to the above-mentioned irritation.

PREPARATIONS.

8-Hydroxy Quinoline Sulphate.—5.8 Gm. of dry 8-hydroxy quinoline were dissolved in 10 cc. of tertiary butyl alcohol and 2.12 Gm. of concentrated sulphuric acid were dissolved in 10 cc. of 95% ethyl alcohol. The acid was added slowly to the base with stirring and a yellow precipitate was obtained immediately. The latter was filtered off, washed with alcohol and dried at 55° C.

	Melting point	176°–179° C.
Analysis	Found	6.78%, 6.85% nitrogen
	Calculated $(C_9H_7ON)_2.H_2SO_4.H_2O$	6.89% nitrogen

The above material is sold commercially as "Chinosol" and the latter material analyses 6.88%, 6.85% nitrogen.

Solubility—70.5 Gm./100 cc. of saturated solution.

8-Hydroxy Quinoline Salicylate—5.8 Gm. of 8-hydroxy quinoline were dissolved in 20 cc. of tertiary butyl alcohol and 5.52 Gm. of dry salicylic acid were dissolved in 10 cc. of 95% ethyl alcohol. The acid was added slowly to the base with stirring. The yellow compound obtained was filtered off, washed and dried at 55° C.

	Melting point	114°–116° C.
Analysis	Found	4.99%, 5.09% nitrogen
	Calculated $(C_9H_7ON).(C_7H_6O_3)$	4.95% nitrogen

Solubility—0.59 Gm./100 cc. of saturated solution.

8-Hydroxy Quinoline β-Resorcylate.—5.8 Gm. of 8-hydroxy quinoline were dissolved in 10 cc. of tertiary butyl alcohol and 8.52 Gm. of β-resorcylic acid were dissolved in 20 cc. of 95% ethyl alcohol. The acid was added slowly to the base and the yellow compound obtained was washed and dried at 55° C.

	Melting point	154°–156° C.
Analysis	Found	4.61% nitrogen
	Calculated $(C_9H_7ON).(C_7H_6O_4)$	4.68% nitrogen

Solubility—0.53 Gm./100 cc. of saturated solution.

8-Hydroxy Quinoline Tartrate.—2.9 Gm. of 8-hydroxy quinoline were dissolved in 8 cc. of tertiary butyl alcohol and 3 Gm. of dry tartaric acid were dissolved in 15 cc. of 95% ethyl alcohol. The base was added slowly to the acid. The

* Scientific Section, A. PH. A., Portland meeting, 1928.

compound separated out in half an hour, was removed, washed, and dried at 55° C.

	Melting point	102°–104° C.
Analysis	Found	4.72%, 4.65%, 4.71% nitrogen
	Calculated (C_9H_7ON).($C_4H_6O_6$)	4.75% nitrogen

Solubility—5.78 Gm./100 cc. of saturated solution.

8-Hydroxy Quinoline Citrate—1.45 Gm. of 8-hydroxy quinoline were dissolved in 8 cc. of tertiary butyl alcohol and 1.92 Gm. of anhydrous citric acid were dissolved in 5 cc. of ethyl alcohol. The base was added to the acid and the resulting solution required seeding to precipitate out our product. The latter was removed, washed and dried at 55° C.

	Melting point	138°–141° C.
Analysis	Found	4.12%, 4.06% nitrogen
	Calculated (C_9H_7ON).($C_6H_8O_6$)	4.15% nitrogen

Solubility—12.19 Gm./100 cc. of saturated solution.

p_H OF COMPOUNDS IN SOLUTION.

The p_H determinations on 10% water solutions of the above compounds were made by R. B. Smith of our laboratory.

	p_H.
8-Hydroxy quinoline sulphate	3.69
8-Hydroxy quinoline tartrate	3.78
8-Hydroxy quinoline citrate	3.84
8-Hydroxy quinoline salicylate	4.04
8-Hydroxy quinoline β-resorcylate	4.33

ANTISEPTIC AND GERMICIDAL TESTS.

The above were carried out by Dr. George F. Leonard of our Biological Laboratories.

Germicidal Test.	Staphylococcus killed in one minute. 1–400.	1–1000.	1–2000.	1–5000.
8-Hydroxy quinoline sulphate	—	—	—	x
8-Hydroxy quinoline citrate	—	—	—	x
8-Hydroxy quinoline tartrate	—	—	x	x
8-Hydroxy quinoline salicylate	—	—	x	x
8-Hydroxy quinoline β-resorcylate	—	x	x	x

Antiseptic Test.	Inhibited. Staphylococcus.				Typhoid.			
8-Hydroxy quinoline sulphate	24 hrs	48	72	96	24	48	72	96
1– 50,000	—	—	—	x	—	—	—	x
1–100,000	—	—	x	x	—	—	x	x
1–150,000	—	—	x	x	—	—	x	x
1–200,000	x	x	x	x	x	x	x	x
8-Hydroxy quinoline citrate								
1– 50,000	—	—	—	x	—	—	—	x
1–100,000	—	—	x	x	—	—	x	x
1–150,000	—	—	x	x	—	—	x	x
1–200,000	x	x	x	x	x	x	x	x

	Inhibited.							
	Staphylococcus.				Typhoid.			
8-Hydroxy quinoline β-resorcylate								
1– 50,000	—	—	—	x	—	—	—	x
1–100,000	—	—	x	x	—	—	x	x
1–150,000	—	—	x	x	—	—	x	x
1–200,000	x	x	x	x	x	x	x	x
8-Hydroxy quinoline salicylate								
1– 50,000	—	—	x	x	—	—	x	x
1–100,000	—	—	x	x	—	—	x	x
1–150,000	—	—	x	x	—	—	x	x
1–200,000	x	x	x	x	x	x	x	x
8-Hydroxy quinoline tartrate								
1– 50,000	—	—	x	x	—	—	x	x
1–100,000	—	—	x	x	—	—	x	x
1–150,000	—	x	x	x	—	x	x	x
1–200,000	x	x	x	x	x	x	x	x

IRRITATION TESTS.

This test was carried out by putting a drop of a 1–1000 solution in the eye of five individuals. At least twenty-four hours elapsed between tests on each individual.

	Strong irritation.	Slight irritation.	Irritation.
8-Hydroxy quinoline β-resorcylate		2	3
8-Hydroxy quinoline tartrate		3	2
8-Hydroxy quinoline citrate		4	1
8-Hydroxy quinoline salicylate	1	4	
8-Hydroxy quinoline sulphate	1	4	

Distilled Water—Solvent—two observed a slight sting but it was highly different from the irritation of the above solutions.

CONCLUSIONS.

From our data it is indicated that

1. Changing of the acid molecule of 8-hydroxy quinoline compounds has very little effect on the antiseptic action of the latter. The sulphate, citrate and β-resorcylate are the best and equally efficient. They inhibit the growth of Staphylococcus and Typhoid bacteria at a dilution of 1–50,000 for seventy-two hours.

2. Changing of the acid molecule affects the germicidal activity of 8-hydroxy quinoline to some extent. The sulphate and citrate were shown to be the most efficient in this respect. A 1–2000 solution of either killed staphylococcus in one minute.

3. No definite relation was found to exist between irritation and the p_H variation caused by the different acid molecules attached to the quinoline nucleus. The two extreme compounds, sulphate and β-resorcylate would tend to indicate some such relation but the intermediate ones do not substantiate such a conclusion. We are led to believe accordingly that the irritation is in all probability a factor of the 8-hydroxy quinoline nucleus itself rather than a factor of the p_H of the aqueous solution caused by the acid molecule attached to it.

RESEARCH DEPARTMENT OF THE CHEMICAL
AND PHARMACEUTICAL LABORATORIES,
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THE EFFECT OF CHANGES OF HYDROGEN-ION CONCENTRATION UPON EMULSIONS OF THE WATER-IN-OIL TYPE.*

BY JOHN C. KRANTZ, JR., AND NEIL E. GORDON.

In a previous communication to THIS JOURNAL, Krantz and Gordon[1] studied the effect of hydrogen-ion concentration upon the stability of oil-in-water emulsions when acacia and tragacanth were employed as emulsifying agents. The results of these investigations were sufficiently interesting to warrant the study of the effect of changes of hydrogen-ion concentration upon the emulsions of the inverted type. It is well known, from the work of Harkins,[2] that sodium oleate, and similar compounds, produce emulsions of the oil-in-water type; whereas, when two hydrocarbon radicals are attached to one metallic atom, as in the case of calcium and magnesium oleates, these substances serve to produce water-in-oil emulsions. Hence, for this investigation magnesium oleate was selected as the emulsifying agent, and olive oil and mineral oil as the dispersion phases.

EXPERIMENTAL.

The emulsions were prepared in quantities of 40 cc. each, emulsifying in each case 10 cc. of the aqueous material, producing a 25 per cent by volume water-in-oil emulsion. Preliminary experimentation with magnesium oleate as an emulsifying agent showed that one gram of the compound was sufficient to emulsify the designated quantity of water. It was further observed that the age of the magnesium oleate influenced its emulsifying capacity. Upon keeping, even in tightly stoppered containers, the compound tends to harden and become brittle; in this condition it does not mix readily with the oil and the emulsions formed by using this substance are granular and unstable. The relative degrees of stability of the emulsions made with freshly precipitated magnesium oleate, and those made with the product which had been kept for six or eight weeks can be observed by studying the following tables of stability.

The aqueous solutions of various hydrogen-ion concentrations were prepared by adding various quantities of hydrochloric acid and sodium hydroxide to distilled water. The p_H of these solutions was determined electrometrically. As these unbuffered mixtures, near the neutral point, change in p_H quite quickly, the emulsions of the mixtures near p_H 7 were prepared as soon as possible after the hydrogen-ion concentration measurement.

The emulsification was accomplished by triturating the emulsifying agent with 18 cc. of oil at 25° C. and adding in one portion the 10 cc. of aqueous fluid. After brisk trituration the formation of the emulsion nucleus could be easily ascertained by the sudden increase in viscosity and the occurrence of a crackling sound when the pestle was pulled through the emulsion. With continued trituration the emulsion nucleus was diluted to the proper volume and stored in dry, well-stoppered graduated containers.

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* Scientific Section, A. PH. A., Portland meeting, 1929.

[1] Krantz and Gordon, JOUR. A. PH. A., 15 (1926), 83.

[2] Harkins, *et al.*, *J. Am. Chem. Soc.*, 39 (1917), 353.

The separation of an inverted emulsion must not be mistaken for the gradual settling of the heavier emulsified water to the bottom of the container, for this might easily be incorporated by agitation. With certain emulsions of this type, employing freshly precipitated magnesium oleate, the authors have observed no separation in a period of eight or ten months. When, however, emulsions are prepared with older samples of the emulsifying agent the separation begins in a much shorter period of time.

OBSERVATIONS UPON THE EFFECT OF CHANGES OF p_H IN WATER-IN-OIL EMULSIONS.

TABLE I.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

					Days.														
No.	p_H.	½ hr.	1 hr.	4 hrs.	1.	3.	4.	7.	11.	15.	20.	28.	38.	45.	52.	59.	66.	73.	80.	87.	94.
1	0.9	10	C. S.																		
2	1.36	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
3	1.87			5	6	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
4	3.05					2	2	3	5	5	5	5	5	5	5	5	5	5	5	5	5
5	3.97					2	3	4	4	4	4	4	5	5	5	5	5	5	5	5	5
6	4.85						1	2	2	2	2	3	4	4	4	4	4	4	5	5	5
7	5.55							1	2	3	3	3	3	3	3	3	3	3	3	3	3
8	7.55							1	2	2	2	3	3	3	3	3	3	3	4	4	4
9	8.02					2	2	3	4	4	4	4	5	5	5	5	5	5	5	5	5
10	9.25					2	2	3	3	4	4	5	5	5	5	5	5	5	5	5	5
11	10.97					3	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5
12	11.75								1	1	1	1	2	2	2	2	2	2	3	3	3
13	12.38																				
14	13.0	Yellow	Granular																		

C. S. = Complete separation.

TABLE II.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

					Days.														
No.	p_H.	½ hr.	1 hr.	4 hrs.	1.	3.	4.	7.	11.	15.	20.	28.	38.	45.	52.	59.	66.	73.	80.	87.	94.
1	0.9	10	C.S.																		
2	1.36		8	10	10	C.S.															
3	1.87			3	5	5	5	6	6	6	6	6	6	6	6	6	6	6	6	7	7
4	3.05					1	1	2	3	3	3	5	5	5	5	5	5	5	5	5	5
5	3.97					4	4	5	5	5	5	5	5	5	5	5	6	6	6	6	6
6	4.85						1	3	3	4	4	4	4	5	5	5	5	5	5	5	5
7	5.55					1	1	2	2	3	3	3	3	4	4	4	4	4	4	4	4
8	7.55					1	1	1	2	2	3	3	4	4	4	4	4	4	4	4	4
9	8.02					2	2	2	3	3	4	4	4	5	5	5	5	5	5	5	5
10	9.25					1	1	2	2	3	3	3	3	4	4	5	5	5	6	6	6
11	10.97					2	2	3	3	4	4	4	4	4	4	4	5	5	5	5	5
12	11.75								2	2	2	2	2	3	3	3	3	3	3	3	3
13	12.38																				
14	13.0	Yellow	Granular																		

C. S. = Complete separation.

Tables I and II indicate that the staple point of these emulsions is near p_H 12.38. The magnesium oleate employed in preparing these emulsions had been

prepared about 14 days prior to its use. Graph No. I shows the average stability of these two series of emulsions over a period of 94 days.

TABLE III.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN MINERAL OIL. (FRESHLY PRECIPITATED MAGNESIUM OLEATE.)

Degree of Separation in Cc. in Different Time Periods.

		Days.													
No.	p_H.	1 hr.	3.	7.	12.	20.	30.	37.	44.	51.	58.	65.	72.	79.	86.
1	0.9	8	8	9	9	9	9	9	9	9	9	9	9	9	9
2	1.36			1	1	1	1	1	1	1	1	1	1	1	1
3	1.87														
4	3.05														
5	3.97														
6	4.85														
7	5.55														
8	7.5														
9	8.02														
10	9.25														
11	10.97														
12	11.75														
13	12.38														
14	13.0			Coarse solid mass											

TABLE IV.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN OLIVE OIL.

Degree of Separation in Cc. in Different Time Periods.

		Days.															
No.	p_H.	1/2 hr.	1 hr.	1.	4.	12.	17.	25.	35.	42.	49.	56.	63.	70.	77.	84.	91.
1	0.9	10	C. S.														
2	1.36		8	10	C.S.												
3	1.87			1	2	2	2	2	2	2	2	2	2	2	2	2	2
4	3.05								1	1	1	1	1	1	1	1	1
5	3.97									1	1	1	1	1	1	1	1
6	4.85									1	1	1	1	1	1	1	1
7	5.55									1	1	1	1	1	1	1	1
8	7.55									1	1	1	1	1	1	1	1
9	8.02									1	1	1	1	1	1	1	1
10	9.25									1	1	1	1	1	1	1	1
11	10.97																
12	11.75																
13	12.38																
14	13.0	Yellow	Yellow					1	6	6	6	6	6	6	6	6	6

Figure 1 shows the emulsions from Tables I and II after thirty days. Reading from left to right these emulsions are numbered as given in Table I.

With magnesium oleate which was freshly precipitated, as was previously mentioned, the range of hydrogen-ion concentration at which the emulsions are unstable is on the acid side. With the freshly precipitated emulsifying agent practically the entire range of the p_H scale from p_H 1.87 to p_H 12.38 was stable as shown by Table III. Yet on the alkaline side of the p_H scale p_H 10.97, 11.75 and 12.38, the degree of creaming was less than when the internal phase was closer to the neutral point. Table III shows the stability of these emulsions over a period of eighty-six days.

TABLE V.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN OLIVE OIL.

Degree of Separation in Cc. in Different Time Periods.

No.	P_H.	1/2 hr.	1 hr.	Days. 1.	4.	8.	12.	17.	25.	35.	42.	49.	56.	63.	70.	77.	84.	91.
1	0.9	10	C. S.															
2	1.36		8	10	C. S.													
3	1.87				1	1	1	2	2	2	2	2	2	2	2	2	2	2
4	3.05									1	1	1	1	1	1	1	1	1
5	3.97										1	1	1	1	1	1	1	1
6	4.85										1	1	1	1	1	1	1	1
7	5.55										1	1	1	1	1	1	1	1
8	7.55										1	1	1	1	1	1	1	1
9	8.02										1	1	1	1	1	1	1	1
10	9.25										1	1	1	1	1	1	1	1
11	10.97																	
12	11.75																	
13	12.38																	
14	13.0	Yellow	Yellow							6	6	6	7	7	7	7	7	7

C. S. = Complete separation.

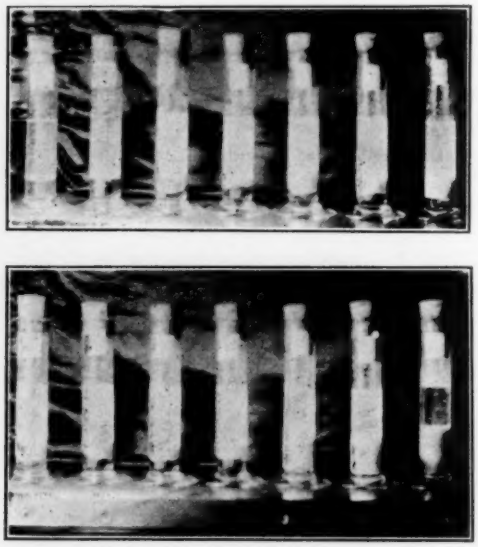


Fig. 1.—Emulsions of solutions of various hydrogen-ion concentrations in mineral oil.

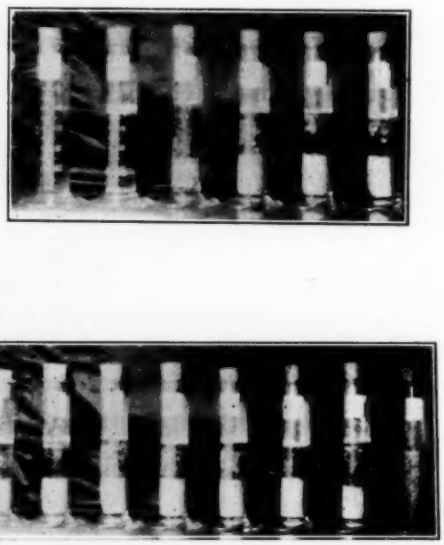


Fig. 2.—Emulsions of solutions of various hydrogen-ion concentrations in olive oil.

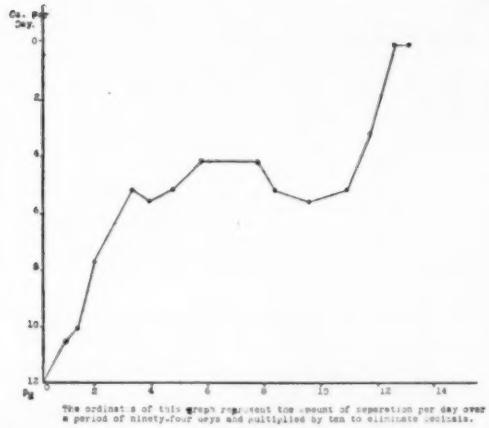
When olive oil was employed as the external phase, employing the same magnesium oleate that was used in the first series of emulsions, the emulsions as a whole were more permanent. The degrees of separation of this series of emulsions are given in Tables IV and V, and the summary of these series of results is plotted in Graph No. II.

Figure 2 shows the emulsions made with olive oil after a period of thirty days. Reading from left to right the emulsions are numbered as given in Table V.

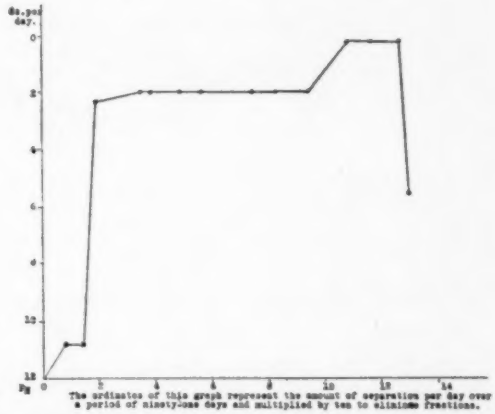
The effect of sodium chloride solution in various concentrations was studied in order to determine the influence of the sodium ion. With solutions of sodium

chloride in concentrations 1 N to 10^{-6} N it was observed that this substance had practically no influence upon the emulsions dispersed in mineral oil.

When olive oil was employed it was observed that the emulsions exhibited a degree of stability which was inverse to the concentrations of sodium chloride.



Graph No. I.—Stability of emulsions in mineral oil and their hydrogen-ion concentrations.



Graph No. II.—Stability of emulsions in olive oil and their hydrogen-ion concentrations.

The degrees of separation with each of these series of emulsions is shown in Tables VI and VII. Figure 3 shows the emulsions in mineral oil after thirty days. Reading from left to right, the emulsions are numbered as given in Table VI.

TABLE VI.—EMULSIONS OF SOLUTION OF SODIUM CHLORIDE IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

		Days.													
No.	Normality.	1.	4.	9.	14.	22.	32.	39.	46.	53.	60.	67.	74.	81.	88.
1	1					1	1	1	1	1	1	1	1	1	1
2	10^{-1}												No separation		
3	10^{-2}												No separation		
4	10^{-3}												No separation		
5	10^{-4}												No separation		
6	10^{-5}												No separation		
7	10^{-6}												No separation		
8	10^{-7}												No separation		

TABLE VII.—EMULSIONS OF SOLUTION OF SODIUM CHLORIDE IN OLIVE OIL.

Degree of Separation in Cc. in Different Time Periods.

		Days.										
No.	Normality.	1.	4.	9.	14.	22.	32.	39.	46.	53.	60.	67.
1	1	1	3	3	3	3	3	3	3	3	3	3
2	10^{-1}	1	2	2	2	2	2	2	2	2	2	2
3	10^{-2}	1	1	1	1	1	1	1	1	1	1	1
4	10^{-3}	1	1	1	1	1	1	1	1	1	1	1

In order to study the influence of hydrogen-ions produced by a source other than hydrochloric acid, solutions of sulphuric acid were prepared, their p_H determined and these were emulsified in mineral oil and olive oil. With olive oil and mineral oil the results were similar to those observed when hydrochloric acid solutions were emulsified. Tables VIII and IX record these results.

Graph No. III shows the stability of the sulphuric acid solutions emulsified in mineral oil.

TABLE VIII.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS (H_2SO_4) IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

No.	P_H.	1 hr.	2 hrs.	Days. 1.	4.	9.	14.	22.	32.	39.	46.	53.	60.	67.	74.	81.	88.
1	1.04	10	C. S.														
2	1.51	4	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7
3	2.17				1	1	1	1	1	1	1	1	1	1	1	1	1
4	3.06													No separation			
5	4.21													No separation			
6	4.85													No separation			

TABLE IX.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS (H_2SO_4) IN OLIVE OIL.

Degree of Separation in Cc. in Different Time Periods.

No.	P_H.	1/2 hr.	Days. 1.	4.	9.	17.	27.	34.	41.	48.	55.	67.	69.	76.	83.
1	1.04	8	8	8	8	9	9	10	C.S.						
2	1.51	6	7	7	7	7	7	7	7	7	7	7	7	7	7
3	2.17		2	2	3	3	3	3	3	3	3	3	3	3	3
4	3.06		2	2	3	3	3	3	3	3	3	3	3	3	3
5	4.21		1	1	1	1	2	2	2	2	2	2	2	2	2
6	4.86		1	1	1	1	1	1	1	2	2	2	2	2	2

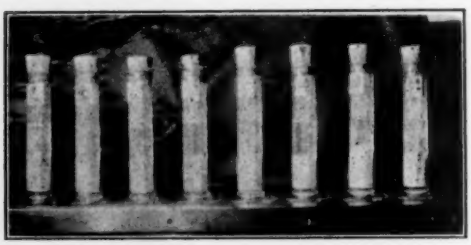


Fig. 3.—Emulsions of solutions of sodium chloride in mineral oil.

In order to determine within a closer range the hydrogen-ion concentration at which the range of instability on the acid side begins the following series of emulsions were prepared using mineral oil as the external phase. Tables X and XI show the degree of separation of these emulsions over a period of eighty-three days, and Fig. 4 shows the emulsions listed in Table XI after thirty days. Reading from left to right the emulsions in Fig. 4 are numbered as given in Table XI.

TABLE X.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

No.	P_H.	1/2 hr.	Days. 4.	9.	17.	27.	34.	41.	48.	55.	62.	69.	76.	83.
1	0.9	5	10	C.S.										
2	1.36	2.5	3	3	3	3	3	3	3	3	3	3	3	3
3	1.87				1	1	1	1	1	1	1	1	1	1
4	2.17								1	1	1	1	1	1
5	3.05													

TABLE XI.—EMULSIONS OF SOLUTIONS OF VARIOUS HYDROGEN-ION CONCENTRATIONS IN MINERAL OIL.

Degree of Separation in Cc. in Different Time Periods.

No.	p_H	Days. ½ hr.	4.	9.	17.	27.	34.	41.	48.	55.	62.	69.	76.	83.
1	0.9	5	9	9	9	9	9	9	9	9	9	9	9	9
2	1.36	1	1	1	1	1	1	1	1	1	1	1	1	1
3	1.87			1	2	2	2	2	2	2	2	2	2	2
4	2.17													
5	3.05													

STUDY OF THE PHYSICAL PROPERTIES OF THE EMULSIONS.

Surface Tension.—The surface tensions of the various emulsions of solutions of different hydrogen-ion concentrations in mineral oil were measured at 20° C. with a standardized DuNoüy tensiometer. The results of these measurements are tabulated in Table XII.

Viscosity.—Using the external phase, mineral oil, as a standard at 20° C., the relative viscosities of a series of emulsions were determined by measuring the rate of flow of the emulsion from a capillary tube. The relative viscosities of these emulsions showed little variation except on the extreme acid and alkaline side of the p_H range. The results of these measurements are tabulated in Table XIII, and plotted in Graph No. IV.

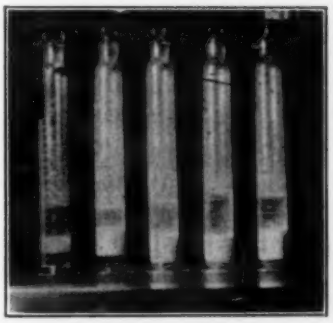
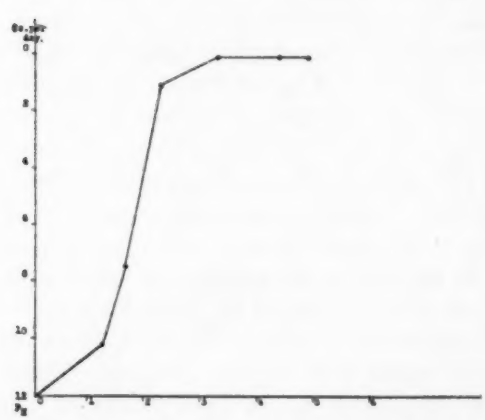
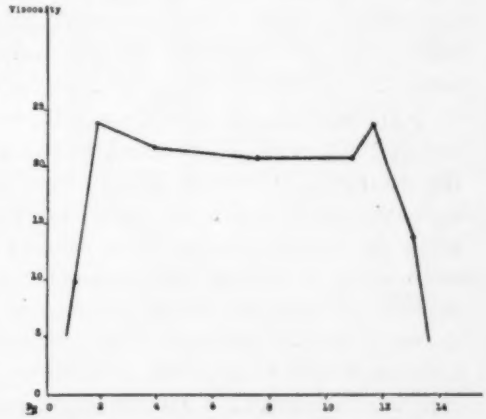


Fig. 4.—Emulsions of solutions of various hydrogen-ion concentrations in mineral oil.

Size of Particle.—Emulsions of solutions of various hydrogen-ion concentrations (colored with a water-soluble dye) were prepared, using mineral oil as the external phase. The size of the particles was measured microscopically. The results of these measurements are given in Table XIV.



Graph No. III.—Stability of emulsions of solutions of various hydrogen-ion concentrations in mineral oil (H_2SO_4).



Graph No. IV.—Relative viscosity of solutions of various hydrogen-ion concentrations in mineral oil.

TABLE XII.—SURFACE TENSION OF EMULSIONS IN MINERAL OIL AT 20° C.

No.	p_H.	Dynes per cm.
1	Mineral Oil	35.62
2	0.9	36.33
3	1.87	37.08
4	3.97	36.81
5	7.55	36.81
6	9.25	36.43
7	10.97	36.60
8	11.75	37.08
9	13.0	36.64

TABLE XIII.—RELATIVE VISCOSITIES OF EMULSIONS MINERAL OIL AT 20° C.

No.	p_H.	Relative viscosities.
1	Mineral Oil	243 sec. unity
2	0.9	0.106
3	1.87	0.242
4	3.97	0.224
5	7.55	0.219
6	9.25	0.214
7	10.97	0.214
8	11.75	0.245
9	13.0	0.144

TABLE XIV.

No.	p_H.	Average diameter of particles in microns.
1	0.9	38.9
2	1.87	21.2
3	3.97	20.6
4	7.55	17.7
5	9.25	22.4
6	10.97	17.7
7	11.75	30.0
8	13.0	30.0

SUMMARY OF RESULTS.

A study of the graphs showing the stability of these emulsions in mineral oil and olive oil, indicate that the most stable range of hydrogen-ion concentration for the internal phase of these emulsions lies well on the alkaline side of the p_H scale. The p_H range at which the emulsions were most stable was between p_H 11 and 12.5. From p_H 11 to p_H 2.5, there is a range of moderate stability, whereas from p_H 2.5 to p_H 0.9 may be looked upon as the range of extreme instability. It is especially interesting to note the increased stability of these emulsions when magnesium oleate, freshly prepared, is used as an emulsifying agent. Similar observations were made with mineral oil and olive oil. If the hydrogen-ions were produced, either by sulphuric or hydrochloric acid the same results were obtained, which seems to indicate that the instability is due to the presence of a high hydrogen-ion concentration. When solutions of sodium chloride in various concentrations were emulsified, there was no influence in stability as far as emulsions in mineral oil were concerned; but when olive oil was used as the external phase, the instability of the emulsions increased with the increase of concentration of sodium chloride in the dispersed phase. A summary of the physical properties of the emulsions shows that there is no significant difference in the surface tension of any of the emulsions. The viscosity determinations show that the emulsions of liquids of various hydrogen-ion concentrations in mineral oil are far less viscid than the external phase alone. On the extreme acid and alkaline side of the p_H scale (p_H 0.9 and p_H 13), there was a marked drop in viscosity. It was of special interest to note that these emulsions of extreme low viscosity were those which were the least stable. The size of the particles of the emulsions in mineral oil increased on the alkaline side of the p_H scale without any appreciable influence upon stability. The unstable emulsion of an internal phase of p_H 0.9, had particles which were larger than those of any other of the emulsions. A careful microscopic study of the size of the particles in relation to stability showed that in emulsions, when the average size of the particles was between 17 and 30 microns, there was no influence in stability. Particles above 30 microns average size, tend to coalesce and separate as a layer beneath. These experiments indicate that the most important factor in the determining of the stability of these emulsions is the influence of the hydrogen-ion concentration of the dispersed phase upon the magnesium oleate. According to Harkins, the magnesium atoms dip down into the aqueous particles, and when the hydrogen-ion

concentration of the aqueous phase is high enough, p_H 2.5, there is a gradual decomposition of the emulsifying agent, which results, ultimately, in the disintegration of the emulsion.

CONCLUSIONS.

1. The influence of changes in hydrogen-ion concentrations on the emulsions prepared with magnesium oleate has been studied.

2. Certain physical constants of these emulsions have been determined.

3. The range of greatest stability of these emulsions is when the internal phase is well on the alkaline side of the p_H scale, namely, p_H 11 to 12.5.

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CALCIUM METABOLISM.

Calcium Metabolism Studies on the Nature and Rôle of the Activators: Researches on Fundamentals for the Prevention of Dental Caries. W. A. PRICE. *J. Am. Dent. Assoc.*, 16 (1929), 265.—Through *Squibb Abstract Bulletin*, Feb. 13, 1929.

In an attempt to interpret previously reported data and recent additions on the subject, the author indicates the importance of proper calcium utilization and its effect on resistance and susceptibility to infection as well as for tooth and bone formation. Calcium in milk, blood and many biologic fluids, which exists partly as diffusible and partly as non-diffusible, can readily be treated so as to change the percentages of diffusible and nondiffusible, by several means, including irradiation or shaking with raw cod-liver oil and with activated cod-liver oil; raw cod-liver oil usually decreases diffusibility, while activated cod-liver oil and irradiation increase it. Normally, there seems to be about 5% more diffusible than nondiffusible calcium, *i. e.*, with total serum Ca of 10 mg., a little more than 5 should be diffusible and a little less than 5 nondiffusible; a variation of 2–3 mg., in either direction seems usually to express itself with distinct physical disturbances. Exposure to radiant energy to 2800 A tend to raise the diffusible calcium; some of the bands beyond 2900 have distinctly harmful effects. A study of the effects of the irradiation of fluids compared both with effects of a demonstration of the irradiation of fluids compared also with effects of administration of the sterol ergosterol, separately and in association, gives evidence of its being similar in effect to, if not directly associated with, the diffusibility phenomena presented. Disturbed calcium metabolism was treated in both experimental animals and in practice by the use of activators, more than 1500 blood chemical studies being made on the latter. The treatment consisted of about 0.5 cc. of activated or raw cod-liver oil in accordance with the balance between diffusible and nondiffusible calcium, and 5-grain tablet of calcium lactate. Evidence of wastage of calcium was shown by the urine calcium and roentgenogram study of the texture of bone with regard to tendency to general calcification or decalcification. "The relation of these phenomena to some of life's problems seems to indicate that herein is an important step forward both in the understanding of bone and tooth formation and disease and the means for the forming of better hard tissues and the prevention of subsequent disease in these tissues."—J. P.

DIRECT SELLING COMPANIES.

Recently the Federal Trade Commission announced that "representatives of between seven and eight million people engaged in 'direct selling' of all kinds of merchandise will meet in a trade practice conference at Dayton, Ohio, next October under auspices of the Commission. Members of the industry will endeavor to adopt standards for correction of unfair advertising. Commissioner William E. Humphrey will supervise the conference." Application for the conference was made by the National Association of Direct Selling Companies, Inc., of Winona, Minn. They are said to do a business of $300,000,000 a year and to employ close to one-half million people. E. C. Brokmeyer (*General Bulletin* No. K-27) comments that retailers should watch this and all other activities designed to eliminate the middleman, wholesaler or retailer.

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NOTES ON THE ASSAY OF SODIUM NITRITE.*

BY EDWARD D. DAVY.

The reports on the assay of nitrites by volumetric, colorimetric and gasometric methods indicate greatest interest in colorimetric methods applicable particularly to small quantities of nitrite. Yoe's "Photometric Chemical Analysis" gives references to one hundred and sixteen colorimetric methods, and new ones constantly make their appearance.

The United States Pharmacopœia seventh revision, in the assay of sodium nitrite, gave a gasometric assay; the succeeding revisions give volumetric assays, depending on the reduction of potassium permanganate in acid solution according to the equation:

$$5\ HNO_2 + 2\ KMnO_4 + 3\ H_2SO_4 \longrightarrow 5\ HNO_3 + K_2SO_4 + 2\ MnSO_4 + 3\ H_2O$$

The method U. S. P. X follows:

> Dry about one Gm. of sodium nitrite to constant weight over sulphuric acid, dissolve salt in sufficient water to make 100 cc. and add 10 cc. of this solution to a mixture of 50 cc. of tenth normal potassium permanganate, 100 cc. of water and 5 cc. of sulphuric acid; warm the liquid to 40° C., allow to stand for 5 minutes and titrate with tenth normal oxalic acid.

The reduction of the permanganate, however, is incomplete, and a precipitate of manganese dioxide results, which may be represented by the equation:

$$4\ HNO_2 + 2\ KMnO_4 + 2\ H_2SO_4 \longrightarrow 4\ HNO_3 + K_2SO_4 + MnSO_4 + MnO_2 + 2\ H_2O$$

The method was tried at the specified temperature and at temperatures of 60°, 75° and 100° with the same result. The oxalic acid reacts slowly with the manganese dioxide in back titration, and the absence of precipitate is the only indication of an end-point.

It is suggested that either of two modifications of the U. S. P. X method be adopted.

First.—Proceed as in the tenth revision method to the titration with oxalic acid, and instead, cool the mixture, add potassium iodide and titrate the liberated iodine with sodium thiosulphate.

Second.—As for foregoing, but instead, add a measured quantity in excess of tenth normal oxalic acid; heat to 80° and titrate with tenth normal potassium permanganate.

These modifications were checked against a solution representing approximately one per cent sodium nitrite with the following results:

First method, 1. 98.15%; 2. 98.24%. *Second method*, 1. 98.11%; 2. 98.04%.

The methods here reported are not new, but are offered as more practical and accurate for the assay of sodium nitrite.

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WESTERN RESERVE UNIVERSITY.

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* Section on Practical Pharmacy and Dispensing A. PH. A., Portland meeting, 1928.

A CHEMICAL COMBINATION BETWEEN MORPHINE AND ASPIRIN.*

BY C. B. JORDAN AND MARGARET S. KLEMME.[1]

Our attention was called to the unusual narcotic effects produced by capsules supposed to be prepared in accordance with the directions in the following prescription:

Dover's Powder
Phenacetin
Acetylsalicylic Acid of each 2 grains
Send 15 such capsules
Sig.: One every 3 or 4 hours with plenty of water.

The capsules caused the patient to go into a stupor somewhat resembling sleeping sickness. The dose was repeated before the attending physician surmised that there was something wrong in the compounding of the prescription. The physician said:

"I took one of these capsules myself, and it produced signs and symptoms in me which I am sure were more marked than would have been produced by one fourth grain of morphine. The signs and symptoms produced in another individual were also much more marked than would have been produced by the same quantity of morphine, so that I am convinced from this standpoint that these capsules contain more than one fourth grain of morphine."

Our first report made on the capsules to the physician, is as follows:

"*First.* When the capsules reached us, the material was massed in a solid condition and separated from the walls of the capsule. When the capsule was opened the material easily dropped out, but was very hard, and it was necessary to cut it with a knife or break it with a pestle. We have no explanation for the hardness of this material, since capsules made according to the directions of this prescription did not contain hard material, unless the ingredients were massed with honey or glycerin or something of that sort. We were informed that the material was not massed. We can offer no explanation for this material setting as it did, unless some chemical action unknown to us took place.

"*Second.* We prepared capsules according to the directions of this prescription, using our own Dover's powder. The Drug Company sent us a sample of their Dover's powder, and we made capsules according to the prescription, using their Dover's powder. The following experiments were performed on these three kinds of capsules: (a) The solubility of the material in water and alcohol was determined. The capsule submitted to us dissolved completely, leaving no residue that could be detected by our highest power microscope. Our capsules did not dissolve but left considerable residue in which it was easy to detect histological features of ipecac and of opium. The capsule made from the Drug Company's Dover's powder did not dissolve completely, but left a residue in which it was easy to identify the histological features of opium and ipecac. From this experiment we are sure that the capsules sent us did not contain any Dover's powder.

"*Third.* The capsules were tested for the presence of phenacetin, aspirin and morphine, and all these were found to be present.

"*Fourth.* Five guinea-pigs were given capsules made according to the prescription from our Dover's powder. No appreciable results were indicated. A day later, these same five guinea-pigs were given capsules as follows: Three were given capsules made according to the prescription from the Dover's powder submitted by the Drug Company and one was given one of the capsules prepared from our Dover's powders and one was given one of the capsules sent us. The first four pigs showed no appreciable reaction. The last pig (the one that received the capsule sent us) showed no reaction for about three and one-half hours and then began to show stupor. This increased until the pig did not respond to outside stimuli, but sat in the corner

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

[1] Purdue University.

of his cage showing considerable stupor, which did not pass away until about six hours after its appearance. This proves conclusively that the capsule contains a narcotic much stronger than could possibly be secured from a capsule filled according to the directions on the prescription.

"From the above experiments we are sure that these capsules did not contain Dover's powder, but did contain aspirin, phenacetin and morphine."

The Drug Company involved believed that, if an error was made, the material used instead of Dover's powder was heroine or dionin. With this in mind we made further tests and the second report is as follows:

"*First.* All the material of the capsule readily dissolves in chloroform. Morphine hydrochloride does not dissolve in chloroform, but heroine does.

"*Second. Very careful tests* compared with known material convince us that the material present gives all color reactions of morphine and does not give the color reaction of heroine.

"*Third.* A quantitative analysis of the contents of the capsule shows only $^{4}/_{10}$ grain of morphine.

"*Fourth.* We are fully convinced that we are working with a chemical compound that has been formed within the capsule, and since it is an unknown compound, it is impossible for us to make a quantitative determination that we can fully rely on. We are preparing mixtures of phenacetin, aspirin and morphine, and moistening them and allowing them to stand, in hopes that we can secure a substance similar to the contents of the capsule."

The third report reads as follows:

"Acting on your suggestion, we have carefully tested dionin by all the tests we know, which are color reactions, and I am inclosing a copy of our chart of tests. Study these tests and I believe you will come to the conclusion that the mixture in your capsule resembles morphine hydrochloride much more than it does dionin.

"We have made a mixture of two grains each of morphine hydrochloride, aspirin and phenacetin, and have heated the mixture occasionally on the radiator. We find that the reaction is taking place similar to the reaction in your capsule. We also find that the solubility of the mixture in chloroform is increasing. You will remember that the solubility of mixture in chloroform was the one surprising thing to us, as fresh mixtures of morphine hydrochloride, aspirin and phenacetin do not dissolve in chloroform. We have also tested this mixture that we heated and find that our tests give results similar to that given by your capsule. This is reported in column six of the color chart.

"We still believe that your capsule contained morphine, phenacetin and aspirin, and that a chemical action had taken place in the capsule."

The report of the color tests is as follows:

REPORT OF TESTS.

Dry Substances.

Reagent.	I. Morphine hydrochloride.	II. Dionin.	III. Morph. HCl + aspirin + phenacetin.	IV. Dionin + aspirin + phenacetin.	V. Your capsule.
Sulphuric acid + 0.005 Gm. selenious acid	Blue to green to brown	Bright green to brown to yellow	Green to brown to yellow	Green to brown to yellow	Blue to green to brown to yellow
Sulphuric acid + 0.005 Gm. molybdic acid	Purple to pink	Brown to bluish	Purple	Brown	Purple
Sol. of formaldehyde + 1 drop sulphuric acid	Purple to wine	Brown to brownish purple	Purple to wine purple	Brown to purple	Purple to wine
Nitric acid	Reddish orange to yellow	Yellow	Orange red to yellow	Yellowish green	Reddish yellow

REPORT OF TESTS—(*Concluded*).

	Aqueous Solutions of:					
	I. Morph. HCl.	II. Dionin.	III. Morph. HCl + aspirin + phenacetin.	IV. Dionin + aspirin + phenacetin.	V. Your capsule.	VI. Our heated mixture of No. III.
Pot. ferricyan. T.S. + 1 drop $FeCl_3$ T.S.	Blue	Blue, after long time	Blue, slowly	Blue, slowly	Blue, slowly	
$FeCl_3$ T.S.	Greenish blue	Yellow	Greenish blue	Yellow	Purple	Purple
$FeCl_3$ T.S. + heat	Brown	Brown	Brown	Wine	Purple	Purple

REPORT OF THE PHYSIOLOGICAL TEST ON GUINEA-PIGS.

Date.	Time.	Pig.	Dose.	Respiration.	Effect on: Heart action.	Eye.	Reflex.
Dec. 10	10:00 A.M.	1	Aspirin Phenacetin Our Dover's P. each 2 grs. 15 capsules	None	None	None	None
Dec. 10	10:00 A.M.	2	Same	None	None	None	None
Dec. 10	10:00 A.M.	3	Same	None	None	None	None
Dec. 10	10:00 A.M.	4	Same	None	None	None	None
Dec. 12	8:30 A.M.	1	Drug Co.'s Dover's P. Aspirin Phenacetin each 2 grs. 15 capsules	None	None	None	None
Dec. 12	8:30 A.M.	3	Same	None	None	None	None
Dec. 12	8:30 A.M.	4	Same	None	None	None	None
Dec. 12	8:30 A.M.	2	Suspected capsule	None	None	None	None
	10:30 A.M.	2		Slower	Slower	None	None
	12:30 P.M.	2		Slower	Stupid and inactive	None	None
	8:30 P.M.	2			Stupid and inactive	None	None
			Becomes practically normal after 24 hours.				
Dec. 16	9:05 A.M.	1	$^1/_{16}$ gr. morph. sulph.	None	None	None	None
Dec. 17	10:40 A.M.	3	$^1/_8$ gr. morph. sulph.	None	None	None	None
Dec. 18	12:20 P.M.	2	$^1/_4$ gr. morph. sulph.	None	None	None	None
Dec. 21	9:10 A.M.	2	Morph. hydrochl. 1 grain Phenacetin Aspirin each 2 grains				
	10:10 A.M.	2		Slow	Stupid	None	None
	12:30 P.M.	2		Slow	Stupid	None	None
	1:30 P.M.	2		Slow	More active	None	None
	2:00 P.M.	2		Faster	More active	None	None

Test for Cl in the capsule from Drug Company *positive*.

CONCLUSIONS.

1. The suspected capsules contained morphine hydrochloride, aspirin and phenacetin.

2. A chemical combination probably took place between the morphine hydrochloride and the aspirin, giving the product a narcotic effect resembling heroine. We believe this to be true because the physical conditions of the contents of the capsule and the pronounced narcotic effect produced indicated it. The contents of the capsule prepared from morphine hydrochloride, aspirin and phenacetin, slightly moistened and heated occasionally on the radiator, underwent the same physical change and produced a similar pronounced narcotic effect.

3. We believe that when prescriptions containing aspirin and morphine are called for, the pharmacist should be very careful that the material be dry and *the patient should be cautioned.*

4. The suspected chemical combination of morphine and aspirin should be further investigated.

THE PRESCRIPTION DEPARTMENT.*

BY ROBERT J. RUTH.

Some time ago a friend of mine, whom I had not seen for a couple of years, dropped into my office. He is a pharmacist located in a town of goodish size about 150 miles from New York. He is no Babbitt and whenever I have the opportunity for a visit with him, I carry away a good thought or two to ponder over.

He has been in business for perhaps a quarter of a century, has owned several drug stores in various locations in the same town, but to my knowledge has never owned more than one store at a time.

Possessing an excellent education, academic as well as scientific, and being a prominent member of this ASSOCIATION, he has—as one would suspect—always felt a strong leaning toward the professional side of pharmacy. Although some of his stores have been large establishments, with much miscellaneous merchandising and fountain business in evidence, they have always presented a highly dignified appearance and exuded an atmosphere strongly smacking of professionalism. The man's appearance and personality enhanced the reputation for accurate and trustworthy prescription compounding which his stores always enjoyed in the community.

Last week he told me that he has moved to a new location and that his store is now a strictly professional pharmacy, with no fountain or side lines, and that he is doing splendidly. He has at last found it possible to open the flood gates to a suppressed desire and practice professional pharmacy exclusively.

Included among the interesting contents of the narrative which he related was the statement that under present conditions only one drug store in fifty can operate successfully as an exclusive prescription store.

After he left, I reflected upon that statement. It means that in this broad land of ours with its more than one hundred million inhabitants, there is only enough prescription and other professional work available to support about 1000 strictly professional stores. I believe my friend is correct in his estimate.

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* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928.

It hardly seems possible that one thousand prescription stores could fill the prescriptions necessary for the health of approximately one hundred and twenty million people—even granting that all of the drug stores not confining their operations to a strictly professional practice would fill many of the available prescriptions.

The truth of my friend's statement only becomes obvious when one considers the great number of dispensing physicians and the multitudinous variety of cults which exist, the members of which practice without resorting to the administration of medicines.

What will be the future status of drug stores? For a number of years several prominent leaders in pharmacy have prophesied that there would come a day to bring about a division of drug stores into two classifications—the merchandising store and the professional pharmacy. I am becoming convinced that they have prophesied correctly.

The population of the United States is steadily increasing, but the increase in the number of drug stores is out of all proportion to the growth of population. We know that many of the stores fail, but new ones spring up to take their places, and it seems evident that when new stores are reasonably located and properly financed and managed they invariably prosper.

How is this possible? Is the volume of actual drug business increasing so exceptionally? We know that it is not. The vast majority of drug stores are making their profits from the soda fountain and luncheonette, cigars and cigarettes, films and cameras, stationery, bristle goods, rubber goods, fountain pens and pencils, a heterogeneous stock of toilet preparations and toilet accessories, electrical supplies, gifts, holiday goods and other merchandise too numerous to list and of a scope that is astounding to contemplate.

Although it jokes about the merchandising drug store, the public likes it and patronizes it. I am convinced that this type of store has not only come to stay, but that it will increase in numbers. The public demands it for its convenience. We have not even begun to see the potentialities of this type of merchandising store, conveniently located, open all day and evening—seven days a week.

Regardless of how little actual professional work these merchandising stores do, they each do a little and some do considerable, and collectively they do so much that they make my friend's figures true, because there is only enough professional business left to support about one thousand strictly professional stores in the United States.

A few of the colleges of pharmacy offer minimum courses of four years of study—the list is growing. In 1932 all of the colleges holding membership in the American Association of Colleges of Pharmacy will raise the length of their courses leading to a degree to a minimum of four years. What then? Will those four-year graduates open merchandising stores? Some may—most of them will not because if the business world appealed to them, they would hardly have studied pharmacy for four years.

Very surely, soon after 1932, I am convinced, will begin the movement leading toward the classification of our present-day drug stores into two groups—one, the merchandising stores, which will surrender all of the professional business and hardly miss it and operate without registered pharmacists and increase in numbers; the other class will operate as strictly professional pharmacies, with registered phar-

macists who will compound prescriptions, dispense drugs and medicines and do laboratory diagnosis. These professional pharmacies will not carry side lines and will be located very much as physicians' offices—in office buildings and in other locations where the high overhead will be eliminated. Perhaps then, if they are given all of the professional pharmaceutical work to do, twenty or twenty-five thousand of them can prosper under present conditions.

The potentialities are unlimited, but dispensing physicians must prescribe and some of the drugless cults must pass into oblivion—which they will—before the prescription business shows an appreciable increase. A glimmer of hope is found in the fact that in America and abroad scientists are manifesting a new and keen interest in all of the drugs and the possibility of many of them yielding valuable principles not as yet discovered.

Just how will the colleges be affected? Until just recently they graduated students in two years; now they require three years and soon the minimum will be four years. A simple problem in mental arithmetic! By graduating one-half as many pharmacists with four years of training, the colleges will have as many students as they had when they were graduating pharmacists under two-year courses. One half as many pharmacists with twice as much training! It does seem that we should be able to report progress.

Since the beginning of civilization, the pharmacist has played an important rôle in the conservation and protection of public health. I have the utmost confidence that his services will be increasingly needful and that the future of pharmacy is indeed hopeful. To-day it is passing through an extremely crucial period. It will emerge the better for the experience. I do not believe that the altering can be hurried—it is a case of time and patience during this period of evolution.

Meanwhile, those pharmacists, who really desire more professional work for their stores and who make an effort to get it, will invariably succeed. I can picture in my mind many splendid pharmacies which I have been in, located from coast to coast and from Canada to the Gulf. There is one in Louisville, Ky., that stands out in my mind. It is a beautiful store which does a large business in splendid drug store merchandise. It has a soda fountain, too, but there is a certain dignity about the establishment that would indicate that they have even professionalized commercialism. Across the rear of the store is a vast expanse of plate glass, behind which white-gowned pharmacists are compounding prescriptions and dispensing drugs and medicines in an immaculate, splendidly equipped laboratory. The psychological effect of this arrangement upon the many patrons has resulted in an immense professional practice for this store. This was one store which wanted professional business and went after it. Professional business came from physicians and patients who have the utmost confidence in the store and which I can attest is deserved.

During the last observance of Pharmacy Week, a pharmacist in Oakland, California, installed a completely equipped prescription case in a large show window. Prescriptions were compounded by white-gowned pharmacists in full view of the public eye. The attention it attracted exceeded anything previously anticipated. Prescription business greatly increased during Pharmacy Week, which might be expected, and at the end of the week the prescription case was taken out of the window. It was considered to have been a huge success. Then even more

gratifying—the following week the prescription business showed a fifteen per cent increase.

Pharmacy Week—October 14th to 20th—observed in 1928 in the United States, Canada, England, South Africa, Australia, New Zealand and Tasmania—not only affords every retail druggist in the United States a splendid opportunity to bring to the public attention the professional side of his establishment, and its potentialities are far greater. By preparing the public mind—making it pharmacy conscious—it will serve to hasten the day when the practice of pharmacy will emerge from the chaotic era through which it is now struggling.

WHY NOT CREATE A "PHARMACY FLAG?"*

BY EDWARD SWALLOW.

It has occurred to the writer that while every nation, state, city and many institutions have their own particular flag or emblem to represent them, the ancient profession of Pharmacy has never adopted this means of inspiration and distinction.

From time immemorial, flags have played an important part in shaping the destinies of the human family and its various activities. The flag appeals to something in the nature of man that has a subtle influence in creating great thoughts, and actions—it is a symbol of past heroic deeds or worthy achievements, and high ideals.

The profession of pharmacy has served humanity for thousands of years, each passing year giving better and more scientific service to the community at large. If ever a profession deserved to have an emblem or flag of its own, it is the profession of pharmacy—a calling that has meant so much in the conservation and protection of public health and welfare.

Stretching back to the very dawn of history we find names of men who have laid the foundation of this honorable calling, and their efforts in the cause of humanity have been nobly followed by thousands of others who, by their work, have built up a science and art second only to the profession of medicine in importance and general helpfulness to their fellowmen; pharmacy has indeed a worthy and honorable past to look back upon and to be proud of.

Modern pharmacy owes its ability to render the public a high-class scientific service to the self-sacrificing and unselfish labors of men of all the civilized nations. England, Germany, France, America, Russia, Switzerland and other countries have produced pharmacists who have added to the science and art generally of the profession of pharmacy. What has happened in the past—one of glorious achievements—is going on to-day, and will never stop. The future of pharmacy will become of ever-increasing importance, of increasing science and knowledge, and of increasing value in regard to its special service to the medical profession and the community at large.

Flags of nations represent the symbols of home and country, national achievements and ideals, reminders of great deeds and worthy men. The flag is the

* Section on Practical Pharmacy and Dispensing, A. PH. A., Portland meeting, 1928. The paper was referred to a Committee of which the author is Chairman, to report at the Rapid City meeting.

emotional tie-up between the individual and the history of his country. When gazing upon the flag of his native land, a man sees a crystallized vision of its history, the accomplishments of his ancestors. Inspired by these things, men have always "followed the flag," even unto certain death. In their worthy efforts to perpetuate and emulate gallant and honorable deeds, men have always been found who will devote their lives to their country and the ideals represented by its flag. A flag is a nation's call for "a union of hearts, the union of hands."

These things are true in relation to national flags and emblems, and should be equally true with the influence exerted by a Pharmacy Flag, an emblem that shall represent the profession of pharmacy and be a constant source of inspiration to all who march under this banner of our ancient and honorable calling. The suggestion is offered that a flag of pharmacy be created, national or international, as is thought best by the leaders in pharmaceutical matters in the several different nations where pharmacy is looked upon as a learned profession.

A pharmacy flag should be so constituted as to express not only science and knowledge, but moral attributes, such as integrity and devotion to high ideals.

Just as a fine piece of sculpture can suggest events and truths, so should our science and art be embodied in such manner as to make our public service for health and welfare an outstanding feature. We want a pharmacy flag that will inspire all pharmacists alike with great thoughts, the intense desire to serve their profession, and add further knowledge to the calling, so that progress is made possible.

The author of this original idea for the creation of a pharmacy flag offers this suggestion to pharmacy generally in all countries. With this idea in mind, a copy of this paper has been sent to the following journals: the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, the *Pharmaceutical Journal* of Great Britain, the *Canadian Pharmaceutical Journal*, the *Australasian Journal of Pharmacy*, and the *African Chemist and Druggist*, all journals representing pharmaceutical associations in their respective countries.

The author expresses the hope that this suggestion will find its way into pharmaceutical journals in Germany, France and other countries, so that a world-wide interest may be aroused.

As every civilized nation has contributed something of value to pharmacy in general, in the event of this suggestion finding favor, each nation might feel disposed to create a pharmacy flag of its own. The designing of such a flag would give each country the opportunity of placing something of national significance upon its Pharmacy Flag.

The symbolism of plants, colors and other things must of necessity be used in constructing a flag for pharmacy. For instance, a key signifies knowledge; bay leaves, reward and victory; orange color, benevolence; purple, loyalty and love of truth; the rising sun or torch, increased knowledge, and so on.

It is needless to point out the many uses that would be made of a pharmacy flag—the National Official Pharmacy Flag. Colleges and pharmaceutical institutions would use them every day. Conventions would see thousands of these banners flying in the breeze. Buttons with the Pharmacy Flag upon them would be upon every student of pharmacy, and during the observance of Pharmacy Week, the drug stores would keep their "flag a flying."

THE RIGHT SIDE OF THE SHOW CASE.*

BY W. BRUCE PHILIP.

I take it our drug organizations and colleges are largely supported by the independent drug store, rather than the chain store. If that is so, we naturally approach our subjects with the idea of bringing out ideas of real value to the independent or small store. I think I can truthfully say that anything that builds up the small stores builds up the chain stores, because the chain store absorbs anything that is good just as fast as it is put out. The chain stores take ideas and use them for their own value.

In most department stores, and other stores of competitive type, there is somebody out in front to greet you, make you feel at home, and to look out to see that you do not leave without being satisfied. The clerks in the chain stores are on the other side of the counter, or on the other side of the show case.

I believe that there is a right side and a wrong side of the show case on which to meet the customer. In the smaller store I believe that the right side of the show case is the same side with the customer. I do not believe in staying in the aisle between the show case and the wall fixtures all the time. I do not mean that I am always out in the center of the store, but I believe that the independent store has an opportunity to greet the customer, because he can be on the outside of the counter, or show case, which is the right side for greeting the customers.

On the right side of the show case you will see all that the customer sees, because he is standing right beside you. If you stay behind the show case you are allowing a wall of sales resistance to stand between you and your customer. By coming out from behind the show case, standing next to your customer, and observing everything just as he sees it, besides being better able to make the customer feel at home, you are paving the way for the additional sale. Doesn't this seem more appealing to you?

You will learn, or have learned, that if you keep your customer talking instead of doing all the talking yourself, the opportunities for the additional sale will continually grow, and it is the continued growth of sales that will raise the average of sales, and make the day more profitable. Therefore, I believe that the right side of the show case is the side upon which you are to greet the customer, and upon which the sales are to be made.

We must also know what is in the show case, around the case, and knowing the merchandise sold, and where it is located so that the customer will readily grasp the conclusion that we know what we are selling.

That chain stores are losing business in some cities is due to the fact that their clerks have not that individuality and personality that the proprietor of a drug store possesses, and ignorance on the part of the chain store clerks of the right methods of greeting the customers.

The knowledge that the druggist gains of the needs of his community, and also from his every-day dealing with men, and understanding of human nature, are some of the added advantages that the independent druggist has over the chain store.

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* Section on Commercial Interests, A. PH. A., Portland meeting, 1928.

ABSTRACT OF DISCUSSION.

The presentation of the paper by Mr. Philip was followed by a general, interesting discussion and brought out the views of the members on the subject—"The Right Side of the Show Case"—these are in part reported in the statements which follow; the subject statement—"The right side of the show case"—is omitted from that of most speakers, thereby avoiding repetition. In a number of instances the reporter failed to get the names of the speakers, hence, omitted.

Robert J. Ruth: "Psychologically speaking, you must always be on the right side of the counter, plus knowing the store and what is in it. You must greet the customer with that peculiar smile, which after you have once given to the customer, you must continue to give him because he is going to expect it from you."

C. W. Holton: "The same side on which the customer is, because there is a greater opportunity for personal contact, friendly atmosphere and better salesmanship."

————————: "The right side of the counter is the customer's side, so the salesman can see with the customer's eyes."

C. H. Packard: "In front of the show case—if you have a clerk to call to your assistance."

B. Olive Cole: "The right side of the showcase is the one the customer first approaches. The pharmacist has opportunity to make the customer feel at home, has opportunity to talk to the customer and also has the opportunity to more easily make a companion sale."

W. E. Chapman: "The right side is in front to greet the customer when he comes in; and the salesman can see the goods from the same point of view as the customer. The floor should be clean; a clerk can notice dirt or other things out of order if behind the counter. Contact as near to the customer as possible."

B. M. Keene: "The side on which the customer is on; the psychology of this situation makes the customer feel more at ease."

Aquilla Jackson: "The right side of the show case is the side on which we find the customer, so that we see ourselves as the customer sees us."

R. B. Rothrock: "The right side of the show case is that which is the most convenient to hold your customer's attention, and that is best adapted to the proper display of the merchandise intended for sale."

C. O'Connell: "The customer's side of the show case is the only side of the show case from the sales point, as the efficient salesman must look with the eyes of his customer."

L. D. Havenhill: "The one on which the customer is, because of the personal contact and the personal interest that it engenders.

J. H. Wurdack: "The front side. Closer contact, influence inversely as the square of the distance."

S. L. Antonow: "The salesman should stand in front of the case where each customer can be faced, ready to greet him when he comes in and make him pleased to buy."

P. Henry Utech: "Outside, because of opportunity for more personal contact—thereby maintaining interest."

Leonard A. Seltzer: "The great problem of relationship between customer and salesman is to establish sympathy. The front side is symbolical of being *with* the customer."

————————: "The side the customer is on, because you are closer to the customer physically and mentally, and better able to convince him."

————————: "Back for routine selling of called-for articles. Front for proprietor, and sales in which increase is possible."

Charles J. Clayton: "The right side of the show case is the customer's side, because there the customer's viewpoint may be had and a more intimate contact with him or her."

C. E. Reed: "The center aisle side is the right side; the personal contact thus attained is of inestimable value."

Leo. G. Penn: "To sum matters up, you must know the store; must know where the desired goods are located; and not take up the time of the customer; in other words, give service."

The following gave expression that the salesman should be on the side with the customer, because it gives closer contact: C. L. Cox, Bernard F. Daubert, Edwin E. Taiber, F. W. Meissner, W. H. Brown, John A. J. Funk, Percy S. Walker, F. M. McCullough and others whose names the reporter failed to record. It is very evident that the subject proved a most interesting one, and profitable to the participants.

DEPARTMENT OF BUSINESS MANAGEMENT

Conducted by Paul C. Olsen.*

COMMENTS, QUESTIONS AND SUGGESTIONS ARE INVITED AND WELCOME.

Readers are invited to submit comments, criticisms and suggestions regarding the material which appears in this department. The Editor also will undertake to answer questions regarding general problems of business management. Letters of general interest will be published, but the writer's name will not be revealed without his permission.

FIVE WAYS TO GET BETTER PROFITS ON THE MERCHANDISE YOU BUY.

The first lesson in drug store management is that the income must be greater than the outgo if the store is to be profitable.

The items comprising the outgo are in about the following proportions in the usual drug store.

Cost of merchandise sold	64 per cent of sales
Operating costs	28 per cent of sales

The largest of the items of outgo and the one which, in my observation, is subject to the greatest variation, is the cost of the merchandise sold. A knowledge of the causes which control merchandise costs is bound, therefore, to decrease the outgo, and thus to increase the net profits of a retail drug business.

At first glance it might seem as if the only possible way to reduce merchandise costs would be to buy at lower prices.

As a matter of fact, this is only one of five possible ways to reduce merchandise costs and one of the least important. In fact, buying at lower prices may result, eventually, in high merchandise costs, as I will show presently.

The first of the five ways to reduce merchandise costs is to take advantage of cash and other discounts which are offered for the prompt payment of merchandise invoices. These savings run from 1 to 5 per cent of the cost of a particular bill of merchandise.

More important than this immediate and easily measured gain is a psychological advantage. Let me explain. Post-dating of invoices, quantity discounts, free goods and similar offers make it very easy to buy huge quantities of goods. The man who discounts his bills thinks not only of these advantages, but also of the day soon to come when the cash must be forthcoming to pay the bill.

Will enough of the merchandise be sold to produce the cash to discount the bill? The man who discounts his bills thinks not alone in terms of buying but also in terms of selling. By looking at both sides of the picture he saves himself many an unwise purchase. The biggest accumulations of dead stock are found in the stores which are the slowest to pay their bills. Important as are the evident

* Instructor of merchandising, Wharton School of Finance and Commerce, University of Pennsylvania, Lecturer on Business Administration, Philadelphia College of Pharmacy and Science.

cash savings from discounting merchandise invoices, of even greater importance and amount are the savings which result from the careful buying, which a man must do who is to be always ready to discount his bills.

The second of the five ways to reduce merchandise costs is to keep at a minimum the waste and loss of stock purchased. I had lunch this noon at a busy soda fountain in a neighborhood drug store. In preparation for a later rush the man at the fountain had sliced two loaves of sandwich bread. While I was eating, the proprietor came back of the fountain and started to prepare his own lunch. He made his sandwiches from a fresh loaf of bread. Evidently, neither the regular service nor the materials used at this fountain were good enough for him, although, in his judgment, perfectly satisfactory for his customers. Aside from the influence of such tactics upon the customers who see them, isn't it apparent that they encourage waste and carelessness in handling materials and supplies by all the employees of the store? Even with the best management, some shrinkage and waste is bound to occur at the fountain. Why encourage more?

Waste occurs frequently, as every druggist knows, in the handling of bulk merchandise. The waste can't be avoided; but the cost of it can be, by making allowances for it in the retail selling prices.

Waste occurs when stock is so carelessly stored that it spoils or becomes shopworn. The ideal drug store, anyway, is a store without a cellar or other storage space, but if such space is used care should be taken to keep the stored merchandise in salable condition. Dampness and strong sunlight are special foes of unsuccessful storage.

Closely allied with waste is actual loss of purchased stock. It may be stolen or just misplaced. Imagine the surprise of a friend of mine, who, when taking inventory, discovered in a dark corner of his cellar nine gross of tooth brushes which, the marks on the box showed, had been bought in 1907.

Merchandise may be wasted, misplaced or stolen, but the invoices representing it are not. The manufacturers and jobbers see to that and see to it that the invoices, eventually, are paid. Paying for merchandise which is wasted, misplaced or stolen is just like paying for merchandise which has never been received. Unfortunately, it doesn't show up this way on the books. The only thing the proprietor knows is that his net profits aren't what he expected they would be, and a further examination shows high merchandise costs.

The arithmetic of that situation is as follows: In a month he buys merchandise which costs him $1000. He expects to sell this merchandise for $1500. Through carelessness, however, $50.00 of the $1000 worth of merchandise is wasted, lost or stolen. He thus sells $950.00 worth of merchandise and receives for it $1425. However, he has to pay the entire bill, of $1000.000 for the merchandise. His merchandise costs, instead of being $66^2/_3$ per cent, as he thought they would be, are 70 per cent of sales. If he makes 7 per cent net on sales where merchandise costs are $66^2/_3$ per cent of sales, it is plain that he will make about $3^1/_2$ per cent net when they are 70 per cent. This waste of $50.00 worth of stock on a $1000.00 purchase has cut in half his net profits from its sale.

The third of the five ways to reduce merchandise costs is to avoid the purchase of items which, later, prove unsalable. This unsalability may result from changes in demand, or actual deterioration of the merchandise itself; exactly

the same effect upon merchandise costs results as if the merchandise were lost, misplaced or stolen. Even if merchandise can't be sold, it must be paid for.

In the discussion of the effect of cash discounts upon merchandise costs I mentioned that probably their most important effect was to make a druggist buy only what he can sell and sell within a reasonable period. Of course this reasoning applies to all stores, but it seems to be most frequently disregarded in those stores which are slow to pay their bills. In fact, one reason why such stores are slow pay is that their shelves are loaded with merchandise which is unsalable or at least difficult to sell.

The fourth of the five ways to reduce merchandise costs is to keep a close watch of cash receipts. If only 95 cents of every dollar taken in from the sale of merchandise is credited to sales it is evident that merchandise costs will be high. The amount charged in the invoice for the merchandise is definite; the percentage on 95 cents is greater than it is on a dollar.

Drug store proprietors have had thousands of dollars stolen from them by dishonest employees. This, however, is not the only cause of cash leaks; carelessness in handling cash often represents a loss. A druggist who kept an accurate set of books found a difference of $1000 at the end of the year between the profits his business earned and the cash he actually had at the end of the year. While his books told him this sad story, they did not bring his money back for him. The next year he carefully balanced his cash every day with the result that the actual discrepancy at the end of that year was less than $5.

A druggist has refused for years to buy an extra register for his fountain; the cigar register was less than 6 feet away, he said. Busy soda fountain people made change from a cigar box behind the fountain rather than take this walk after every sale. Yet this druggist is always wondering why his fountain is not more productive of profit.

Another frequent cash leak, which results in the appearance of high merchandise costs, is the habit of taking cash from the till for the proprietor's personal use or for legitimate business expenses which are not recorded.

The effect of cash leaks is to make merchandise costs appear higher than they actually are. Therefore, when merchandise costs do appear high, this is one of the possible causes to be carefully investigated.

The fifth of the five ways to reduce merchandise costs is the most obvious and that is why it is given last. It is to sell merchandise at prices sufficiently above its cost to bring a profit. Druggists sometimes overlook the fact that the gross and net profits per item are not the only determinants of the total net profits earned in a business. The volume of business and the turnover are also vitally important to total net profits. A thousand sales with a net profit of 1 cent each are far better than one sale with a net profit of 50 cents. Usually the merchandise which sells in largest volume is also the merchandise which has the most rapid turnover, thus reducing the investment and risk. Turnover and volume are of no advantage, of course, if merchandise is not sold at a price sufficiently above the cost of the merchandise to permit at least a small profit. Given this small profit per unit, however, large volume and rapid turnover can overcome much higher unit margins on merchandise which does not sell in volume and which does not have rapid turnover.

Therefore, don't judge net profits on an item merely by the gross and net profits per unit. The old story of the high merchandise costs of the woman who bought apples for 5 cents each, and sold them at 6 for a quarter on account of her large volume of sales and rapid turnover is still true, of course. But remember that a hundred sales with 10 cents net profit on each one represents a better proposition than the same time and money spent on one sale with a dollar net profit. Volume and turnover make this possible.

RÉSUMÉ OF THE GOLDEN JUBILEE MEETING OF THE MISSOURI PHARMACEUTICAL ASSOCIATION.*

BY AMBROSE MUELLER.

The fiftieth annual convention of the Missouri Pharmaceutical Association was held June 19 to 22, 1928, at Sedalia, Mo., a beautiful, centrally located inland city situated on the M. K. & T. R. R. Sedalia is nearly the geographical center of Missouri, and every summer, during August, the State Fair holds its annual exhibits of farm products, horses, cattle and sheep, and in fact everything of interest to the farmer and the general public.

Sedalia was also the birthplace of our ASSOCIATION; it was here that the first meeting was held in 1879.

The original call was sent out on a post card and read as follows:

"*Druggist's Convention.*—At a meeting of some of the druggists of Boone and adjoining counties held at Columbia, Mo., September 10, 1879, it was resolved: That with a view of elevating the standard of the retail drug business and for the purpose of effecting an organization or association of the members of the profession, by which a united effort can be brought to bear on the state legislature, such as will procure the enactment of such laws as will secure and protect us in our rights, and such other matters as may benefit the profession generally; that a convention of the retail druggists be called to meet at Sedalia, Mo., October 29, 1879. All druggists in the state are invited to attend, signed F. R. Dimmitt, Secretary; P. S. Hocker, Chairman."

This proves beyond a doubt that the Missouri druggists were among the first to recognize that much might be accomplished by an organization of this kind for professional and commercial benefits, but looking mainly for the safeguarding of the public against unscrupulous and unethical men in the drug business.

Sixty-two members were enrolled and fourteen more added to the list of charter members before the first meeting adjourned. Among them we find the names of two old-time friends known to all of us—J. M. Good and W. H. Alexander, both of St. Louis, and graduates of the Philadelphia College of Pharmacy. That their interests were not exclusively confined to Missouri is evidenced by the fact that a resolution was passed to send a copy of the proceedings to the AMERICAN PHARMACEUTICAL ASSOCIATION and to appoint delegates to attend the convention at Saratoga, N. Y.

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* Section on Historical Pharmacy, A. PH. A., Portland meeting, 1928.

The Golden Jubilee meeting was well attended, considering the inclement weather. Much credit for the success is due to the ladies for their efficient work in bringing the members to the meeting. The officers were *President*, Alf. W. Pauley; *First Vice-President*, W. E. Bard; *Second Vice-President*, Chas. Hutchason; *Third Vice-President*, H. T. Simpson; *Treasurer*, William Mittelbach; *Secretary*, W. H. Lamont; *Historian*, Ambrose Mueller; *Assistant Secretary*, Robert Lisch; *Honorary President*, M. Q. Williams.

Six members of the original sixty-two are still living and four of them were present at the meeting and enjoyed several of the sessions. On one of the evenings a banquet was given in their honor and the toastmaster called on the charter members present for short talks.

Delightful musical numbers interspersed with after-dinner speeches added to the enjoyment of the occasion. The Veterans' luncheon was another enjoyable affair, presided over by Teddy Hagenow, president of the St. Louis Club.

A PLEA FOR VETERAN DRUGGISTS' ASSOCIATIONS.*

BY WILHELM BODEMANN.

According to the rule of children's games, *3 times and out*, I file my appeal for veteran associations for the third time.

So far the United States has 19 such associations, but I hope the A. PH. A. will help fight for more, so that all large cities will have such unique organizations.

You may ask what these organizations have to do with the history of pharmacy. The answer is "Everything." Our obligations are for each member to furnish his photograph and autobiography, and with this material on hand the future historians of American pharmacy will have a clear road. Aside from the historical value of our association, our meetings are an oasis in the drudgery of retail pharmacy. We exclude politics, business and religion from our discussions, and only nurse that wonderful plant "Gemüthlichkeit"—called by Joe Remington the untranslatable word.

The gospel of veteranism preaches love, fraternity, humanity and Gemüthlichkeit. If this gospel had pervaded at the green table of effete monarchies in Europe in 1914 there would not have been that atrocious, senseless World War.

Our Chicago association, founded by T. N. Jamieson, is the parent. Our members are mostly of foreign parentage, but all are American citizens. During that horrible World War our members had relatives and friends on both fronts, but our platform proved an iron wall against friction and disharmony. The symphony of love and harmony was not spoiled by a dissonance. We stood firmly by the Stars and Stripes, although we deplored that senseless slaughter, senseless in the start and in the effects. President Wilson kept us out of war and got us into war for the sake of making the world safe for democracy. Europe drove away a host of monarchs, established republics, and to-day has more war and strife than before 1914.

Therefore, establish veteran associations all over the country and America will be the best democracy to live in.

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* Section on Historical Pharmacy, A. PH. A., Portland meeting, 1928.

BUSINESS AND PROFESSIONAL ETHICS.*

BY E. C. CALLAWAY.[1]

From the beginning, the conduct of professional men has been governed by ethics. Always it has been more of a negative program than a positive force. There have been times when ethics produced progress; but in the main, through rules of prohibition, it has merely sought to maintain the present high calling of the professions and took no thought of the future. In a changing world, ethics, like Reuben's home-spun pants, has followed the growth of the professions by a new patch being applied every time they burst. While ethics might have led the way, it has not done so. Here is fertile ground for cultivation—the field of professional ethics. How can we extend professional ethics to the benefit of the professions?

We have always considered that there was ethics of business. It does not seem to have occurred to us that there is a business side of ethics. Professional men are supposed to make money and to keep money, so that in old age they can retire with a comfortable living laid by. In the very nature of things, the temptation to unprofessional conduct comes out of the economics of the professional life. Surely, in training the young lawyer, dentist, physician or pharmacist it would not be out of place to devote some time to the business side of ethics. By that we mean the proper conduct of a professional man in money matters. Sad to say, we have neglected this most important business.

It is a notorious fact that professional men are easy marks for the get-rich-quick artists. When they can't sell mining stock and oil stock to doctors, dentists and lawyers, they will have to quit.

A doctor who has a growing community practice loses his savings in a mining deal. He suddenly finds himself hard pressed for funds. Although nearly every one in the community owes him, he can only think of one thing—make money faster. So he begins to use gouging methods on his patients, or unethical means and methods. He makes a pile of money, yes, but a stock promoter comes along who is a college graduate also. He had taken a six weeks' course in salesmanship in Bunkum Business College. He sells the doctor a large interest in a cactus farm in Arizona. Thus we see very often that after six years in college our highly trained professional man is as ignorant of economics as a country yokel and is meat for the sharper. He has no business-like system of fees. He keeps no books that you could recognize as such. He has no system about collections. He would know a good "surgical instrument" in the dark but he would not know a "negotiable instrument" if he saw one. Away back there they left a big hole in his education and he fell into the hole. Living as we do in a world of economics and intense commerce, we turn our professional men loose as babes-in-the-woods. The professional man must pick up his knowledge of business, if any, from those who have degenerated in the profession, and his ethics is sure to sink to a low, degenerate level. Perhaps you will say that I am exaggerating this factor. I answer that we need to magnify it now, for we have ignored it long enough. Lack of training in business is the underlying cause that produces many ambulance-chasing lawyers, "painless" advertising dentists and quack doctors. If this is true in even a small measure, then we know

* Section on Commercial Interests, A. PH. A., Portland meeting, 1928.

[1] Dean of Highland Park College of Pharmacy, Des Moines University.

where to look for the trouble when we see professional pharmacy going down hill. Call it "Commercial Pharmacy," or what you will, the method of practice of his profession so as to maintain himself has never been taught the pharmacist.

In colleges of pharmacy and in drug stores I have met many men who see professional pharmacy going down hill, and they have set themselves, holding on to the rope with all their strength. A druggist says: "When I have put in a fountain and sell wall-paper, I quit." A professor says: "When a College of Pharmacy has to teach "Sales Methods" and "Merchandizing" it is about time for me to retire." Holding back does not save the situation. What we need is up-hill power.

Less than half a century ago a boy began to wash bottles in the "Apothecary Shop" and ten years later he would emerge with a shop of his own, a full-fledged pharmacist. In those days the pharmacists were artists; they loved to teach all they knew to the apprentice. Alas, most of these teachers are dead! In the past decade the University and the drug store have united in producing pharmacists. Briefly, the scheme has been for the University to furnish the training in science and technology, and for the drug store to give the training in business. In the main, the University courses have kept pace with the changes in pharmacy and the materia medica of the day; but what about the drug store end of the training? We find many and various kinds of teachers; we find some who do no teaching. We have fooled ourselves into believing that from three to five years at drawing soda, wrapping packages, and making change will produce a successful store proprietor out of a clerk who has gone to college and learned all about drugs and medicines. How many stores are there where the clerks pass through all the experiences of a modern pharmacist, from sweeping the floor to filling the prescriptions, keeping the books and buying the goods?

There is one way to be sure that the next generation of pharmacists may have a training that is the best possible under the circumstances. That is, to take the efficient store-proprietor and teacher out of the business and place him in a college of pharmacy where all the future pharmacists will receive his instruction in business, and where he will have time and opportunity to put his subject over. Granted that he will be teaching business where there is no business, it would be consistent with all our college work. General Goethals built many a theoretical canal on paper in the class room or he never could have dug the Panama Canal. Every dentist fills many teeth in a vice before he is allowed to attempt one in a patient's mouth. With a competent teacher who has been proven in the school of experience, and a model drug store as a practical laboratory, the college of pharmacy could standardize the business training of the pharmacist. Where else can it be done?

We have looked upon our mission in the College of Pharmacy as limited to the conservation of public health and the conservation of human life, but when we find the field of commerce is about to wreck pharmacy, then we ought to reserve the right to educate pharmacists in commerce.

Where is there a better place for the profession to teach commercial pharmacy than in the College of Pharmacy, where the profession is highly regarded and the ideals of professional service are placed first. Certainly it is foolish for us to turn over such important matters that are vital to the future of the profession to men who are going out of pharmacy and into the racket-store business. It is my conviction that the colleges of pharmacy should take hold of the business training of pharmacists in the principles of economics and sound business practice.

There is just as much need for the corner drug store to-day as there ever has been. Every day the life of someone in every community is on the drug scales. People want to know that the hands that measure out the medicine are skilled

hands. They want to know that the heart of the man who does these things and supplies this knowledge of dangerous and mysterious chemicals is a heart that cares. No price is too great to pay for that. They never yet have refused to pay when the matter was understood. They are always ready to pay more for consecrated service than they are for goods. The real profit in the drug business is in the man selling himself to the community. If the college trains the future pharmacist in business as well as in ethics, he will have a clear understanding of the economic value of his professional service. He will be too busy selling himself to engage in cut-rate wars with a concern that has no personality. Sell goods, of course, he must, but he does not have to match prices with anybody.

Not long ago I talked with an 80-year old pharmacist, who had been on the same corner ever since 1878. He was the only druggist in the town. He had a long flowing beard that gave character to his face. There was an odor of oil of cloves about him. The store was clean and the stock inviting. There was the mingled aroma of spices and drugs about the place instead of "hot dogs." He owned the building, the large stock of goods, the controlling interest in the local bank and what not. He knew by their first names every man, woman and child in the town and the nearby country. All had come under his ministering hand. Indeed the joys and sorrows of the whole community were written across his kindly face. "Have you never had competition?" I asked. "Oh, yes, several have come and gone!" He said it with a twinkle in his eye.

I stood in a large city in a modern drug store on the corner. It was a busy place. Customers were standing in line and half a dozen clerks were rushing about. Upstairs, in the back, the prescriptions were being turned out on an average of one every three minutes. Across the street was a chain store—a beautiful place. Just a few stragglers were going in to the soda fountain. The manager was even sweeping the floor, trying to look busy. The prescription department was idle. I said to the quiet man of the professional store, who seemed to carry with him the atmosphere of the old reliable corner drug store, "How has it been since the Chain moved in across the way?" "You may not believe it," he replied, "but our daily sales have increased. It seemed to bring more people to the corner." "Do you still get your price?" I asked. "Absolutely," he replied; "you see, the people here know us." If a city of 100,000 people had 80 store proprietors who were business experts as well as ethical pharmacists, chain stores would never go in.

I am fully convinced that the greatest need of the hour is pharmacists. We cannot help the men who now own the stores, but we can save the corner drug store by turning out pharmacists who get their training in business and economics from the same fountain from which they get their ethics. If we do not put the dollar on top in training them, very few of them will do so in actual practice. When they have run their race and finished the course, their riches will consist just as much in unseen values that will not fade away as dollars do. With real pharmacists capable of maintaining themselves in the business and rendering a continued service in spite of the chain stores and side-line competition, the corner drug store will live.

Give me a due and decent esteem of my profession and of myself, that I may regard no man's occupation higher than mine, envying none so long as I serve honorably and well the sick and the injured.—*Paraphrased.*

THE HIGH COST OF PUBLICITY.*

BY P. HENRY UTECH.

"I can't believe that," said Alice. "Can't you?" the Queen said in a pitying tone. "Try again; draw a long breath, and shut your eyes."

No Alice in Wonderland ever had a more difficult time trying to extricate herself than we, the American public, are experiencing to-day. As purchasers of every-day commodities we are surrounded with a barrage of conflicting statements, high-sounding phrases, convincing claims, fancy packages and whatnot, until we are lost in a veritable maze of impenetrable ignorance. In their avidity to attract the buyer and hold his interest, to rivet his attention and break down sales' resistance, all the human emotions and weaknesses are played upon by the promoters of these newer products in the wild endeavor to have us exchange our hard-earned dollars for the latest type of motor car, the 1928 model cigarette lighter, or even our favorite breakfast food when invested with a more fantastic label. The same is true whether we speak of food-stuffs or furniture, of textile or toilet articles, of building materials or medicines, in short, of every human desire and need.

It is not the purpose of this paper to discuss the merits or methods of the products above referred to, but rather to review some interesting data that has appeared recently with reference to a number of products with which we as pharmacists are all more or less familiar. For years the writer has noted with keen interest the rise, growth and development of new remedies, nostrums, medical preparations, as well as technical products, that have appeared in the market from time to time, the number of which has grown with remarkable rapidity within the past decade or two. Sponsored by an intensive campaign of advertising wherein the reported merits of the product or preparation were cleverly extolled and exploited to a credulous and unsuspecting public; many of these newly devised products have, within a reasonably short time, met with considerable financial success, while certain others were so over-zealous in exaggerating the claims for merit or therapeutic efficiency of their product, that their program in many instances was abruptly terminated by such protective agencies as the Federal Food and Drug Act, the Council of Pharmacy and Chemistry of the American Medical Association, and in the case of technical products or compounds, by the Government Bureau of Standards and the Federal Trade Commission. The many fallacies, quacks, nostrums, deceptions and misstatements of fact exposed by these latter agencies would fill a large volume of interesting information—or more properly speaking interesting misinformation.

Singularly enough many of these newly devised compounds and preparations are usually sold by the pharmacist and it is therefore highly desirable that he acquaint himself with some of the salient facts concerning these products, together with such information as may be available about their general character or composition. It is fascinating indeed to note how many of the simple remedial agents sold daily by the pharmacists, when disguised with a ficticious name, a deceptive dress, or even a different color or flavor, and bedecked with much ingenious hypo-

* Parts of a paper presented to Section on Commercial Interests A. PH. A., Portland meeting, 1929.

thetical verbiage, may be made to possess all the magic, mystery and chicanery of the Black Art. Judged by the success of many of the promoters, the American public to-day are fully as unwary and credulous as were our ancestors back in the days of sorcery and witchcraft. Let me give you a few concrete illustrations. Within the past decade we have all witnessed an intensive advertising campaign—nation-wide in character—extolling the virtues and merits of different brands of tooth-pastes, tooth-brushes, mouth lotions, etc., and while this increased interest in dental hygiene has been more or less educational and therefore commendable, the same cannot be truthfully said of all the much-heralded publicity attached thereto. On the contrary, much of the popular advertising has been misleading and deceptive, *e. g.*, we are told in the advertising "copy" that many functional maladies are traceable either directly or indirectly to defective teeth, hence it is all-important that the mouth be kept in a healthy condition. We must therefore protect ourselves against pyorrhea, the forerunner of systemic poisoning, arthritis, neuritis, senility, etc., hence the use of a distinctive brand of dentifrice or antiseptic mouth wash will bring about the normal healthy mouth conditions.

Now, as to the merits of the suggested treatment for the "cure" of the aforesaid condition, permit me to give you the results of laboratory tests recently made by the American Medical Association. It reads:

"A dentifrice is not a therapeutic agent for diseased gum tissue. It is under no circumstances a cure or even a preventative of pyorrhea. The medicines incorporated in many of the popular and widely advertised dentifrices are valueless and only afford the manufacturers selling talks to get their products before the public.... The dentifrice has in itself no chemical or magical power to clean. Because dentifrices are pleasantly flavored, they make brushing the teeth a more agreeable task."

Since the scientific function of a mouth wash is to eliminate the debris loosed by the brush, it follows that any simple saline solution used as a rinse will be fully as effective as the more costly highly advertised products. Dental authorities therefore recommend either warm water; a teaspoonful of salt to a pint of water; the salt solution with a little sodium bicarbonate added. The cost of these latter is practically negligible. With reference to the value of the so-called antiseptic mouth washes, Hygeia says:

"The cool, clean feeling left by agreeable highly flavored and equally high-priced concoctions leads the patient to think his mouth is clean. He is really only disguising a dirty mouth and in using such mouth washes he is a worthy disciple of the Oriental who uses perfume instead of soap and water."

As stated above, high pressure advertising is the medium employed for developing the market for these various products and the information used in the copy is oftentimes grossly misleading. The reason, therefore, is all too apparent once the *modus operandi* is understood. Read the statement of Mrs. Helen Woodward, one of the most successful advertising women in America. She says:

"If you are advertising any product, never see the factory in which it is made. Don't know too much about it. Don't watch the people at work. Just know all you can about the finished article and the man who is going to buy it, and the conditions of selling in the business. Because, you see, when you know the truth about anything—the real inner truth—it is very hard to write the surface stuff which sells it."

The author here took occasion to point out many specific instances of gross misrepresentation and misstatements of fact, of a number of nationally advertised preparations, the result of revelations and discoveries made by the Council of Pharmacy and Chemistry of the American Medical Association, all of which were highly instructive and interesting.

She also referred to a number of technical products and preparations commonly sold by the pharmacist, the composition of which in many instances revealed nothing more or less than a simple drug store commodity, disguised with a foreign flavor or odorous principle, and exploited to the laity at fabulous prices. Mimeograph inks, for example, costing upwards of $3.00 per gallon, upon analysis proved to be merely highly colored dilution of glycerine and water. The Government Post Office Department recommends a formula of two ounces of glycerine to one gallon of warm water as answering every possible requirement. The widely advertised food products were also discussed. "Simple cereals" said the author, "when put through special mechanical processes yield enormous profits for the producer." He quoted the statement of the Department of Agriculture to the effect that all such products are no richer in nutritive value and that the housewife can by grinding her cereal in a coffee mill secure a good breakfast food for from three cents to four cents per pound.

In conclusion, the author said that conditions on the whole were much improved within recent years. Public Health authorities and individual communities the country over are awakening more and more to their civic trust and responsibility. Federal regulation, and also many individual states, have well defined statutes as protective measures. The indiscriminate use of narcotic drugs is now forbidden under the Federal Food and Drugs Act. Sodium benzoate content in soft drinks must be declared and sugar substitutes may not be used in candies unless stated on the label. In many states, natural fruit flavors only are permitted as beverages. Fraudulent claims and misstatement of fact are no longer permitted on the labels of products, however much they may be tolerated in advertising, to which the law does not extend.

As pharmacists, it is clearly our duty as guardians of the public health to take cognizance of these problems; to investigate the nature and character of these new fangled nostrums, their merits and composition, in order that we may be in better position to safeguard the health and welfare of the people.

THE ACTIVITIES OF F. ARTHUR BECKETT IN EDUCATIONAL PHARMACY.*

BY FRANK T. GREEN.

The writer first met F. Arthur Beckett in the year 1882 while he was a student in the California College of Pharmacy, which was located at Dupont and California Streets, San Francisco. A close friendship was formed between us. He was in the first-year class and I in the second. He was engaged at that time in the manufacturing laboratory of Redington & Company, wholesale druggists.

* Section on Historical Pharmacy, A. PH. A., Portland meeting, 1928.

The earliest data relative to his college activities, after graduating with the class of 1883 with the degree of Graduate in Pharmacy, appear in the publication "Constitution and By-Laws of the Alumni Association of the California College of Pharmacy." This authority places him as being a member of the executive committee in the years 1883 and 1884.

He became secretary in 1885, vice-president in 1886, and president in 1888. In the years 1892 and 1893 he was again a member of the executive committee. Upon the reorganization of the administration of the Alumni Association his name appears on the list of the Board of Trustees for the years 1893, 1894 and 1895.

This brief résumé of Mr. Beckett's activities in his alumni shows that he was accepted as a leader and an advisor by his fellow graduates. These many offices were honorary ones. His services were cheerfully given and there was never a tinge of self-interest in his actions as a member or as an officer. His record as an officer in the California College of Pharmacy began in the year 1889 and lasted for a period of seventeen years, the year 1906 marking the close of his services. The offices held by him in the college are given with dates. He was vice-president of the Board of Trustees in the years 1889 and 1891, also in 1892 and 1893, becoming president of the Board of Trustees in 1896 and 1897.

Mr. Beckett realized the importance of reorganizing the governmental system of the College so that it would be in harmony with the methods of administration which were in vogue in well-conducted business establishments. During these preceding years the California College of Pharmacy was a part of the organization of the California Pharmaceutical Society. The responsibility of the former trustees then rested upon the directors. Mr. Beckett was a member of the Board of Directors from 1893 to 1906. As president of the Board of Trustees and president of the Board of Directors he carried the presidency of the College of Pharmacy.

Mr. Beckett was a member of the committee which waited upon Mr. Adolph Sutro in the hope of obtaining a gift of land from him upon which could be erected the group of buildings known as the Affiliated Colleges of the University of California. The California Legislature had voted the sum of $250,000 to erect buildings which were to be occupied by the Colleges of Medicine, Dentistry, Pharmacy and Law. Mr. Beckett's efforts were untiring as usual and bore fruit, inasmuch as Mr. Adolph Sutro presented to the University of California, the ground, comprising thirteen acres, on which the buildings now stand. Hitherto these colleges were in separate locations in San Francisco.

In the year 1895 a committee was appointed to visit the professional colleges of the United States and Canada in order to make an extensive study of buildings, furniture and equipment so that the architects and governing groups could be informed as to the requirements necessary in planning the new buildings. This committee consisted of Dr. Beverly Cole, representing Medicine, F. Arthur Beckett representing Pharmacy, and Albert Sutton, Architect. This group of men spent three months of travel in the United States and Canada, making an intensive study of professional colleges and their housing. The elaborate report of Mr. Beckett's, relating to Colleges of Pharmacy, is among the archives of the college.

Mr. Beckett was tall in stature, a man of breeding, ability and integrity. In argument, he presented his points with a kindly smile. His manner was such as to provoke no ill will on the part of his opponents. In looking backward along

the roadway over which the college traveled when its student-body numbered two or three score, one realizes the worth of those workers of the past in the cause of pharmaceutical education; and prominent among this list of honorable men is the name of F. Arthur Beckett.

BARCELONA COMMITTEE OF INTERNATIONAL CULTURAL RELATIONS.

The College of Doctors of the University, District of Barcelona, Spain, has organized an International Committee of Cultural Relations, composed of representatives of the University, of the College of Doctors, and of the Consular Corps. The members of the governing body of this committee are one professor and one collegiate doctor for each of the five university faculties, namely, philosophy and letters, law, science, medicine and pharmacy.

The committee has been organized because of the International Exposition to be held in Barcelona, and will initiate its work by offering information and guidance to those visitors particularly interested in science, enabling them to become acquainted with the cultural centers of their city, and will assist them in arranging conferences and other meetings pertinent to the occasion. The purposes are broad and include the cultivation of cultural relations with foreign countries, coöperation in all legitimate enterprises which tend to strengthen international relations and encourage the study of Spanish and culture in universities and other scientific centers abroad.

SCHOLARSHIPS AND FELLOWSHIPS SUPPORTED BY INDUSTRY.

In a list of research scholarships and fellowships, recently published, there are quite a number that have been established by the pharmaceutical industries, but only a few which are for the encouragement of pharmaceutical research. There are other scholarships in schools of pharmacy, to that extent the list referred to is not complete and, no doubt, with proper encouragement and invitation these and endowments for the Headquarters and activities of the AMERICAN PHARMACEUTICAL ASSOCIATION would be increased. The list referred to includes only Fritzsche Brothers Fellowship, at the University of Wisconsin, for the study of volatile oils and related subjects; the Parke, Davis & Co. Fellowship and the Frederick Stearns & Co. Fellowship in Pharmacy, at the University of Michigan. The JOURNAL would like the opportunity of listing the scholarships and fellowships for the encouragement of pharmaceutical research, of announcing additions to those that have been established and of endowments for the A. PH. A. Headquarters.

William Duncan, pharmaceutical chemist of Grantown, Scotland, testified in a homicide case of the Northern (Scotch) Circuit, 50 years ago, before Lord Deas, Judge of the Court. The latter complimented the witness on the very distinct and intelligent character of his evidence "as a professional man." The *Chemist & Druggist* quotes the "Inverness Courier."

WITNESS: "Thank you, my Lord. I may mention I am not a professional man, only the village chemist."

LORD DEAS: "You are a chemist?"

WITNESS: "Yes, my Lord."

LORD DEAS: "Well, then, you are a professional man; always stand up for the rights of your order."

CORNERSTONE OF BROOKLYN COLLEGE OF PHARMACY LAID.

In the presence of five hundred members of the student body, faculty and members of the Kings County Pharmaceutical Society, Dr. William C. Anderson, dean of the Brooklyn College of Pharmacy, included in Long Island University, laid the cornerstone, on June 29th, for the new college structure. George R. Christ, president of the Kings County Society, made a brief speech of welcome to all present. Arthur S. Somers, member of the Board of Education, spoke on the altruistic nature of the effort which made the erection of the building possible. Former U. S. Senator William M. Calder, who is vice-president of the Brooklyn Chamber of Commerce, represented the Chamber at the exercises.

MEETING OF MEMBERS OF COMMITTEE ON PHARMACEUTICAL SYLLABUS.

Chairman J. G. Beard has requested the members of the Committee on Pharmaceutical Syllabus to meet with him during the Convention in Rapid City.

EDITORIAL NOTES

Editor: E. G. EBERLE, 10 West Chase St., Baltimore, Md.

Members of the Council, A. PH. A.: S. L. HILTON, *Chairman;* CHARLES H. LAWALL, *Vice-Chairman;* E. F. KELLY, *Secretary;* H. V. ARNY, A. G. DUMEZ, H. A. B. DUNNING, H. C. CHRISTENSEN, J. A. KOCH, J. H. BEAL, W. B. DAY, T. J. BRADLEY. *Ex-Officio Members:* D. F. JONES, *President;* A. W. PAULEY, W. H. ZEIGLER, *Vice-Presidents;* C. W. HOLTON, *Treasurer;* E. G. EBERLE, *Editor of the Journal;* A. G. DUMEZ, *Editor of the Year Book;* AMBROSE HUNSBERGER, *Chairman of the House of Delegates.*

Collaborators: The Members of the Council; E. FULLERTON COOK, *Chairman,* U. S. P. Revision Committee; W. L. SCOVILLE, *Chairman,* N. F. Revision Committee; the Chairmen of the Sections, A. PH. A.; J. C. MUNCH, A. L. I. WINNE, P. H. DIRSTINE, R. B. ROTHROCK, LYMAN F. KEBLER; A. G. DUMEZ, *President,* A. A. C. P.; CHARLES B. JORDAN, *Chairman,* Executive Committee, A. A. C. P.; H. M. LEROU, *President,* N. A. B. P.; HENRY C. CHRISTENSEN, *Secretary,* N. A. B. P.

A CORRECTION.

In the article in the July issue of the JOUR. A. PH. A., entitled "IV. Examination of Acriflavine Base (So-Called Neutral Acriflavine) by George W. Collins," the last sentence under Revision of Standards on page 669 should read:

> "Transfer about 0.5 Gm., accurately weighed, to a 400-cc. beaker, and dissolve in 100 cc. of water: the hydrogen-ion concentration determined by using the hydrogen electrode and a calomel cell (normal potassium chloride solution) corresponds to a p_H of not less than 3 nor more than 7."

GEORGE W. COLLINS.

NEW AND NONOFFICIAL REMEDIES.

The following additional articles have been accepted as conforming to the Rules of the Council on Pharmacy and Chemistry of the American Medical Association for admission to New and Nonofficial Remedies. A copy of the Rules on which the Council bases its action will be sent on application.

W. A. PUCKNER, *Secretary.*

LIPOIODINE-CIBA (See New and Nonofficial Remedies, 1928, p. 215).

Actions and Uses.—In the form of lipoiodine-Ciba diagnostic, it is used as a contrast medium in the localization of bronchial and pulmonary lesions, as a diagnostic aid in gynecology and myelography, for detecting urethral strictures, and in cavities where intensification of the Roentgen ray shadows is desired.

Dosage.—For diagnostic work, from 5 to 20 cc. of lipoiodine-Ciba diagnostic, as determined by the extent of the field to be investigated.

The following dosage forms have been accepted:

Lipoiodine-Ciba Diagnostic: A 60 per cent solution of lipoiodine-Ciba in sesame oil.

Ampuls Lipoiodine-Ciba Diagnostic, 5 cc.: Each ampul contains 5 cc. of a 60 per cent solution of lipoiodine-Ciba in sesame oil.

ACIDOPHILUS BACILLUS LIQUID-MULFORD.—A whey culture of *Bacillus acidophilus* (Moro) in a whey medium. It contains 50 million viable organisms per cubic centimeter at the time of sale.

Actions and Uses.—See Lactic Acid Producing Organisms and Preparations, New and Nonofficial Remedies, 1928, p. 228.

Dosage.—One to two tablespoonfuls in a glass of milk or in half a glass of water to which has been added two teaspoonfuls of lactose, three times daily at any time before or two to three hours after a meal.

Manufactured by H. K. Mulford Co., Philadelphia. No U. S. patent or trade-mark.

From *Jour. A. M A.* for March 2, 1929.

DIAL-CIBA.—Diallylbarbituric acid.—Diallylmalonylurea.—2,4,6 - trioxy - 5 - diallylpyrimidin.—$(C_3H_5)_2C$ CONH CONH CO.

Dial-Ciba differs from barbital (diethylbarbituric acid) in that both of the ethyl groups of the latter are replaced by allyl groups.

Actions and Uses.—The actions and uses of dial-Ciba are essentially similar to those of barbital, but dial-Ciba is more active than barbital and it is used in correspondingly smaller doses. Fractional doses are used as a sedative and larger doses as a hypnotic.

Therapeutic doses act on the higher cerebral centers and exert no injurious action on the heart or circulation. The hypnotic action is induced within one-half to one hour.

Dosage.—As a sedative: 0.02 to 0.04 Gm. (1/3 to 3/4 grain) two or three times daily. As a hypnotic: 0.1 to 0.3 Gm. (1 1/2 to 4 1/2 grains) one-half to one hour before sleep is desired.

Manufactured by the Society of Chemical Industry in Basle, Switzerland (Ciba Company, Inc., New York, Distributor). U. S. patent 1,042,265 (Oct. 22, 1912; expired). U. S. trade-mark 98,204 and 126,088.

Tablets Dial-Ciba, 0.1 Gm. (1 1/2 grains).

Elixir Dial-Ciba: Each 4 cc. (1 fluidrachm) contains 0.05 Gm. (3/4 grain) in a menstruum containing alcohol 25 per cent.

Dial-Ciba occurs as a fine, white, crystalline powder, with a slightly bitter taste; completely soluble in alcohol and ether; very slightly soluble in cold water; insoluble in the paraffin hydrocarbons. A saturated aqueous solution is acid to litmus paper. Dial-Ciba melts at 171–173° C.

Place approximately 0.3 Gm. dial-Ciba in a 25-cc. glass-stoppered cylinder, add a mixture of 1 cc. normal sodium hydroxide solution and 5 cc. of water, shake the contents for one minute, filter through paper and divide into two portions; to one portion add 1 cc. of mercuric chloride solution: a white precipitate results, soluble in 10 cc. of ammonia water; to the other portion add 5 cc. of silver nitrate solution: a white precipitate results, soluble in 5 cc. of ammonia water. Boil 0.5 Gm. with 5 cc. of a 25 per cent sodium hydroxide solution: it is decomposed with the evolution of ammonia. Dissolve 0.1 Gm. in 1 cc. of sulphuric acid: the liquid assumes a yellow color, changing slowly to a brownish red, finally to a dark red. Place 1 Gm. in a 25-cc. glass-stoppered cylinder, add 10 cc. of water, shake for one minute, filter through paper and divide into two portions; to one portion add 0.5 cc. of a saturated bromine water: an immediate discoloration occurs; to the other portion add 0.1 cc. of tenth-normal potassium permanganate: a yellow color appears immediately.

Boil 0.5 Gm. of dial-Ciba with 50 cc. of water for two minutes: no odor develops; cool and filter: separate portions of 10 cc. each of the filtrate yield no opalescence with 1 cc. of diluted nitric acid and 1 cc. of silver nitrate solution (*chloride*); no turbidity with 1 cc. of diluted nitric acid and 1 cc. of barium nitrate solution (*sulphate*); no coloration or precipitation on saturation with hydrogen sulphide (*salts of heavy metals*).

Incinerate about 1 Gm. of dial-Ciba, accurately weighed: the residue does not exceed 0.1 per cent. Dissolve about 0.5 Gm., accurately weighed, in 25 cc. of previously neutralized alcohol; dilute with an equal volume of water and titrate with tenth-normal sodium hydroxide solution, using thymolphthalein as an indicator: the amount of tenth-normal sodium hydroxide solution consumed corresponds to not less than 98.5 per cent, nor more than 101.5 per cent of diallylbarbituric acid.

From *Jour. A. M. A.* for March 23, 1929.

LENIGALLOL.—Pyrogallolis Triacetas.—Triacetylpyrogallol. $C_6H_3(CH_3CO_2)_3$.—Pyrogallol triacetate, obtained by replacing the hydroxyl groups of pyrogallol with acetate groups.

Actions and Uses.—Lenigallol as such is said to be nonpoisonous and nonirritating, but it produces a mild and painless corrosive effect by the gradual liberation of pyrogallol. (See note under Creosote and Guaiacol Compounds.)

It is introduced as a substitute for pyrogallol in psoriasis, lupus, acute and subacute eczema of children and other skin diseases.

Dosage.—In 5 to 10 per cent ointment with zinc oxide.

Manufactured by Knoll A.-G., Ludwigshafen a.Rh., Germany (E. Bilhuber, Inc., New York, distributor). No U. S. patent or trade-mark.

Lenigallol is prepared by boiling 10 parts of pyrogallol, 1 part sodium acetate and 25 parts of acetic anhydride for two hours, and washing the crystalline product on a filter with water.

It is a white, crystalline powder, melting at 165° C. It is insoluble in water, but soluble with decomposition in warm aqueous alkalies.

Lenigallol is incompatible with alkalies, strong acids and oxidizing agents.

BISMUTH SODIUM TARTRATE-SEARLE

(See THE JOURNAL, June 30, 1928, p. 2103).

The following dosage form has been accepted:

Solution Bismuth Sodium Tartrate-Searle, 1.5 per cent: An aqueous solution containing bismuth sodium tartrate-Searle 0.015 Gm., benzyl alcohol 0.02 Gm., and sucrose 0.25 Gm., in one cubic centimeter.

From *Jour. A. M. A.* for April 6, 1929.

SODIUM THIOSULPHATE IN MERCURY POISONING.

T. E. McMurray and G. G. Gibson (*Med. Jour. and Record* (May 1, 1929), 519) record five cases of mercury poisoning, not to prove that sodium thiosulphate is the only important antidote for this condition, but to show that, owing to its low toxicity, it may be advantageously used with other routine measures. One patient had taken three mercury bichloride tablets, another had swallowed four, two had each taken two tablets, and the last patient only half a tablet. The cardinal symptoms of mercury poisoning were present in all these cases. The administration of sodium thiosulphate gave much relief within a few hours, and all the patients recovered. The treatment employed was gastric lavage with white of egg and sodium bicarbonate solution, followed by 10 per cent solution of sodium thiosulphate, some of which was left in the stomach. One ounce of the 10% solution of the drug was given intravenously three times a day for two days, and 2 ounces by mouth every two hours for the first day, then three times a day for four days. In one case a high enema of 300 cc. was given on two successive days, and in another case two high enemas, each of a pint. Supportive treatment was instituted and catheterization performed when necessary. The authors state that bowel and kidney lesions clear up more rapidly under the sodium thiosulphate treatment, and that very large doses of this salt can be used with impunity, and seem to have more effect than smaller ones.—Through *British Medical Journal* of July 13, 1929.

PERSONAL AND NEWS ITEMS.

President David F. Jones and Mrs. Jones have returned from an extended automobile trip, during which a number of state associations were visited. President Jones spread the message of the A. PH. A., and is pleased with the results of his visits. The mileage covered during the six weeks represents almost an endurance record, equaling a distance of twice that from coast to coast.

Pharmacists of Washington, D. C., made their annual water trip last month. At Baltimore they were joined by **Dr. R. L. Swain** and family, **Mr. and Mrs. L. S. Williams, Mr. and Mrs. Aquilla Jackson** and others. **Paul Pearson** and wife welcomed the visitors.

Dr. Charles H. Mayo, on July 23rd, was awarded the degree of Doctor of Science by the Court of Leeds University, England. Manchester University also conferred honorary degrees on both William J. and Charles H. Mayo.

P. Henry Utech read a paper on "Modern Miracles" at the final monthly meeting of the season of the "Round Table," held in the Unitarian Parish House, Meadville, Pa. Mr. Utech brought the work of pharmacists to the attention of those in attendance.

Graduates in medicine and pharmacy of the classes of 1908, 1909 and 1910 of the Medico Chirurgical College of Philadelphia, tendered a testimonial dinner to **Dr. I. V. S. Stanislaus,** at Hotel Jermyn, Scranton, on June 15th. Dr. Stanislaus, who is a member of the faculty of the Brooklyn, N. Y., College of Pharmacy, served as dean of the Medico-Chirurgical College from 1908 until its merger with the Philadelphia College of Pharmacy and Science.

Dr. Ernest S. Guenther, of Fritzsche Brothers, Inc., who is now in Bulgaria distilling Rose Oil for his firm, reports that the flowers are much more expensive this year and that as a result Pure Otto of Rose will reach much higher price levels than have prevailed during the last two or three years.

Dr. Carl L. Alsberg, director of the food research institute at Stanford University, has been appointed a member of the United States delegation to the Conference of the Institute of Pacific Relations which will meet in Kyoto, Japan, from October 28th to November 9th.

Captain Claude Clairborn Cannon, of the Medical Administrative Corps Reserve, was ordered to two weeks of active duty at Fort Eustis, Virginia. He has returned to his former duties.

Secretary W. E. Bingham has entered on the third decade in service for Alabama Pharmaceutical Association.

G. A. Bender, *Chairman of Publicity* for the Rapid City meeting has given out interesting bulletins; the publicity is instructive and of a high order. *The Northwestern Druggist* included an illustrated 8-page folder in its recent issue devoted to the Rapid City meetings together with information relating to the "Wonderland."

Earl E. Pugh has advised us of a judgment of $200,000 in Mobile, against a drug firm for alleged error in delivering a prescription, which caused a typhoid fever patient to suffer—the daughter of Charles Waltman of Mobile. The child died, but the newspaper account does not definitely state whether death was due to the error.

The Messenger for July has illustrations of the Pharmacy of 1829, the installation of which was made part of the Centennial Celebration of New York College of Pharmacy. The issue of the college publication is designated the "Centennial Celebration Issue."

The Mask, for July, is an A. PH. A. issue, containing also a number of interesting articles relating to various pharmaceutical subjects. Although the meeting of Kappi Psi fraters will be informal the number of those who contemplate to be in Rapid City is growing.

OBITUARY.

EDGAR B. ALLEN.

Funeral services for Edgar B. Allen, whose death occurred Wednesday, June 5th, in Washington, D. C., were held at H. D. Oliver's funeral apartments. The Rev. A. P. Williams, pastor of McKendree M. E. Church, officiated. There was a large attendance and many floral offerings. A delegation from the Order of Fraternal Americans was in attendance. Interment was in Riverside Cemetery.

Mrs. H. M. Allen, of Norfolk, Va., widow of the deceased, is a member of the AMERICAN PHARMACEUTICAL ASSOCIATION. She has been in the drug business for more than 45 years.

EDWARD HAMILTON SQUIBB.

Dr. Edward Hamilton Squibb, aged 76 years, of Brooklyn, N. Y., retired physician and a member of the board of directors of E. R. Squibb & Sons, died of heart disease at his

Cape Cod summer home, South Harwich, Mass., July 7th. He was the son of the late Dr. Edward Robinson Squibb. Dr. Edward H. Squibb had lived in Brooklyn, his birthplace, most of his life. After attending the Brooklyn Polytechnic Institute and the University of Virginia, he went to Harvard where he was graduated in 1878. Three years later he received his medical degree from the New York College of Physicians and Surgeons. He was a member of a number of organizations, among them being the New York Academy of Medicine, the New York Society for the Relief of Widows and Orphans of Medical Men, of which he was treasurer; New York Academy of Sciences, New York Botanical Garden, and the Brooklyn Institute of Arts and Sciences.

Prof. Hans Meyer, explorer and geographer, died at the age of seventy-one years in Leipzig, on July 6th, from the effects of an infection contracted during his recent trip to the Canary Islands. He was a member of the Bibliographisches Institut, publishers of Meyer's Lexikon.

THE BRITISH CONFERENCE IN RETROSPECT.

Quoting the *Pharmaceutical Journal and Pharmacist* of July 6, 1929, "the Dublin Conference (British) can unreservedly be pronounced a signal and memorable success. The Chairman's address was a masterpiece of its kind, the communications to the Science Sessions both in number and quality were exceptionally satisfactory, and the discussion of them was inadequate only because of limitations of time. The three subjects for consideration and discussion at the Delegates' meetings were all opposite and of direct pharmaceutical interest and practical value, and, as will be found from the report of the proceedings to be published later in our columns, the discussions were animated and profitable. The transactions of the Conference all through were of such a character as to show that, in point of vitality and vigor, it is going from strength to strength.

"The contemporary man of science and the scholar are less austere and remote than their predecessors of the Victorian Age, and, on occasion, can unbend more or less graciously. There are still some disciples and exponents of the cult of high thinking and plain living who do not gladly countenance the continued expansion of the social and festive side of the Conference, which they are prone to fear is at the expense of the more serious and solid business and objects for which it should stand. This is surely a groundless apprehension. Social intercourse forges the strongest and most enduring bonds in human life, and untold good is wrought by the fellowship and fraternization at Conference and similar meetings. It is there that men and women get to know and understand one another, not as names but as objective realities, who, fortunately, may turn out to be much more human and friendly than fancy had painted them to be.

"Irish hospitality is renowned all the world over. It has incomparable virtues of spontaneity, sincerity and bountifulness, all of which were copiously exemplified in the reception given to the Conference in Dublin which was honored by the high officials of the Irish Free State, and sumptuously entertained and feted by the Dublin and provincial chemists. The attendance came fully up to high-water mark, and notwithstanding some unexpected difficulties with which they were confronted, the Reception Committee worked wonders in planning and carrying out the complicated arrangements for the accommodation, comfort, convenience and enjoyment of their visitors."

Cardiff, Wales, was chosen for the 1930 meeting.

MONTANA PHARMACEUTICAL ASSOCIATION.

Among the features of the program of Montana Pharmaceutical Association was a paper by Prof. Robert C. Line, dean of the School of Business Administration, University of Montana, and another by Paul C. Vornhold on "Drug Merchandising."

A Veterans' luncheon was held at which Emil Starz, State Chemist and President of the "Pioneers" presided. President C. B. Sande urged a new state pharmacy in his address. Prof. H. J. Ostlund reported on the activities of the Research Bureau.

The following were elected officers for the ensuing year:

President, Fred P. Rixon, Billings.

First Vice-President, S. O. Clinton, Butte.

Second Vice-President, Charles W. Rank, Virginia City.

Third Vice-President, R. A. Griffin, St. Ignatius.

Secretary, J. A. Riedel, Billings.

Treasurer, Mae C. Higgins, Manhattan.

SOCIETIES AND COLLEGES.

SEVENTY-SEVENTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION, ALEX JOHNSON HOTEL, RAPID CITY, SO. DAKOTA, AUGUST 26TH TO 31ST.

A few additions will be made to programs of the Sections and the other bodies which will appear in the program now being completed for the meetings.

Aside from the entertainment features the following information will be of particular interest: Address by Dr. C. C. O'Harra, "The Black Hills and the Bad Lands;" by Dr. James H. Beal, "At the Bottom of the Well;" by Dean C. B. Jordan, "Professional Pharmacy," illustrated; by Dr. Charles H. Mayo, "The Chemistry of Nature." Report on A. PH. A. Headquarters, Chairman H. A. B. Dunning.

Hotel Rates will be found on page 741 of the July JOURNAL; also the names of Committee Chairmen.

Railroad Rates.—See your Railroad Agent for attractive Summer Rates.

The Plant Science Seminar will be held at Game Lodge, August 19th to 24th; program in this Section.

The Research Conference will meet on Saturday, August 24th, at Alex Johnson Hotel; program in this Section.

The Conference of Pharmaceutical Secretaries will be held during the week of August 26th; program in this Section.

The Conference of Pharmaceutical Law Enforcement Officials will be held Monday, August 26th, at 8:00 P.M.—Alex Johnson Hotel.

Entertainment features of the week follow:

MONDAY, AUGUST 26TH.

Reception for Ladies, 3:00–5:00 P.M.
American Association Colleges of Pharmacy, Dinner, 6:00 P.M.
National Association of Boards of Pharmacy, Dinner, 6:00 P.M.
Informal Party, 9:30 P.M.

TUESDAY, AUGUST 27TH.

Tour of Rapid Canyon for all registered delegates and guests, 7:00 A.M.–12:00 M.
Dinner Phi Delta Chi Fraternity, 6:30 P.M.
Dinner Kappa Psi Fraternity, 6:30 P.M.
Musical and Bridge for Ladies, Badger Clark, South Dakota Poet, Masonic Temple, 8:00 P.M.
Other fraternity, alumni and other luncheons can be arranged for on Thursday and Friday, or on Tuesday, at the time of the other fraternity dinners.

WEDNESDAY, AUGUST 28TH.

Visit to Museum of School of Mines (for the ladies) 2:30 P.M.
AMERICAN PHARMACEUTICAL ASSOCIATION Banquet (Informal) (for all registered delegates and guests) 6:30 P.M.

THURSDAY, AUGUST 29TH.

Luncheon of Veteran Druggists, 12:00 M.
Trip to Hot Springs (for the ladies) 12:30 P.M.
Informal Dance, 9:30 P.M.

FRIDAY, AUGUST 30TH.

Bridge Tea, Country Club (for the ladies) 2:00 P.M.

SATURDAY, AUGUST 31ST.

Auto excursion to high points in Black Hills (for all registered delegates and guests) 8:00 A.M.

GENERAL PROGRAM FOR THE SEVENTY-SEVENTH ANNUAL MEETING, A. PH. A. AND AFFILIATED ORGANIZATIONS.

All official sessions of the meeting will be held in the Alex Johnson Hotel, Rapid City.

SATURDAY, AUGUST 24TH.

9:30 A.M. National Conference on Pharmaceutical Research.
2:00 P.M. National Conference on Pharmaceutical Research.
Program in this Section.

MONDAY, AUGUST 26TH.

8:30 A.M. Meeting of the Council, A. PH. A.
9:30 A.M. National Association Boards of Pharmacy.
Program, see page 723, July Journal.
9:30 A.M. American Association Colleges of Pharmacy—Executive Committee; Teachers' Conferences:

Chemistry Conference; Practical Pharmacy Conference; Materia Medica, Pharmacognosy and Botany Conferences; Commercial Section.

Program, see page 743, July Journal.

12:00 M. Luncheon Meeting, Committee on Standards of Drugs and Chemical Products.

2:00 P.M. National Association Boards of Pharmacy.

2:00 P.M. American Association Colleges of Pharmacy.

3:00–5:00 P.M. Reception (for the ladies).

6:00 P.M. American Association Colleges of Pharmacy, Dinner.

6:00 P.M. National Association of Boards of Pharmacy, Dinner.

8:00 P.M. American Association Colleges of Pharmacy.

8:00 P.M. Conference of Pharmaceutical Law Enforcement Officials.

9:30 P.M. Informal Dance.

TUESDAY, AUGUST 27TH.

7:00 to 12:00 A.M. Tour of Rapid Canyon.

2:00 P.M. Joint Session National Association Boards of Pharmacy and American Association of Colleges of Pharmacy.

6:30 P.M. Fraternity Dinners.

7:30 P.M. First Session House of Delegates, A. PH. A.

8:30 P.M. National Association Boards of Pharmacy.

8:30 P.M. American Association of Colleges of Pharmacy.

WEDNESDAY, AUGUST 28TH.

9:00 A.M. First General Session, A. PH. A.

1:30 P.M. House of Delegates, A. PH. A.

2:30 P.M. Visit to museum of the School of Mines (for the ladies).

3:30 P.M. First Session Scientific Section.
First Session Section on Commercial Interests.
First Session Section on Historical Pharmacy.

4:30 P.M. Conference of Pharmaceutical Association Secretaries.

6:30 P.M. AMERICAN PHARMACEUTICAL ASSOCIATION Banquet, Informal, followed by dancing.

THURSDAY, AUGUST 29TH.

9:00 A.M. Council, A. PH. A.

9:00 A.M. First Session Section on Education and Legislation.
First Session Section on Practical Pharmacy and Dispensing.
Second Session Section on Historical Pharmacy.

12:00 M. Luncheon of Veteran Druggists.

12:30 P.M. Trip to Hot Springs (for the ladies) (courtesy of the members of South Dakota Pharmaceutical Association).

2:00 P.M. General Session, A. PH. A.

4:30 P.M. Conference of Pharmaceutical Association Secretaries.

8:00 P.M. Joint Session Scientific Section and the Section on Practical Pharmacy and Dispensing.
Second Session Section on Commercial Interests.

FRIDAY, AUGUST 30TH.

9:00 A.M. House of Delegates, A. PH. A.

2:30 P.M. Bridge Tea (for the ladies) at Country Club.

2:30 P.M. Second Session Scientific Section.
Second Session Section on Practical Pharmacy and Dispensing.
Second Session Section on Education and Legislation.

7:00 P.M. Final Session House of Delegates.

9:00 P.M. Final General Session, A. PH. A.

10:00 P.M. Reorganization Meeting of the Council, A. PH. A.

SATURDAY, AUGUST 31ST.

8:00 A.M. Auto excursion to high points in Black Hills.

THE GENERAL SESSIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Association Officers: *President*, D. F. Jones; *Honorary President*, F. E. Stewart; *First Vice-President*, A. W. Pauley; *Second Vice-President*, W. H. Zeigler; *Secretary*, E. F. Kelly; *Treasurer*, C. W. Holton; *Editor of the Year Book*, A. G. DuMez; *Editor of the Journal*, E. G. Eberle.

Officers Elect: *President*, H. A. B. Dunning; *First Vice-President*, A. L. I. Winne; *Second Vice-President*, W. B. Goodyear; *Members of the Council* (for three years), J. H. Beal, C. E. Caspari, C. H. LaWall; *Member of the Council* (for one year, to fill the unexpired

term of the late Geo. M. Beringer), W. Bruce Philip.

Sessions: Wednesday, August 28th, 9:00 A.M.; Thursday, August 29th, 2:00 P.M.; Friday, August 30th, 9:00 P.M.

WEDNESDAY, AUGUST 28TH, 9:00 A.M.—*First General Sessions.*

1. Reading of Communications.
2. Address, Dr. C. C. O'Harra, "The Black Hills and the Bad Lands."
3. Report of the Secretary, E. F. Kelly.
4. Report of the Treasurer, C. W. Holton.
5. Report of the House of Delegates, Ambrose Hunsberger, *Chairman.*
6. Address of the President, D. F. Jones.
7. Address, James H. Beal, "At the Bottom of the Well."
8. New Business.

THURSDAY, AUGUST 29TH, 2:00 P.M.—*Second General Session.*

1. Minutes of the First General Session.
2. Reading of Communications.
3. Report of the House of Delegates.
4. Report of the Headquarters Building Campaign Committee.
5. Report of the Headquarters Building Site Committee.
6. Report of the Headquarters Building Plans Committee.
7. Address (Illustrated), Dean C. B. Jordan, "Professional Pharmacy."
8. Unfinished business.
9. New business.

FRIDAY, AUGUST 30TH, 9:00 P.M.—*Final General Session.*

1. Minutes of the Second General Session.
2. Reading of Communications.
3. Final Report of the House of Delegates.
4. Unfinished Business.
5. Presentation of the Ebert Prize.
6. Address, Dr. Charles H. Mayo, "The Chemistry of Nature."
7. Installation of Officers.
8. Final Adjournment.

COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Officers and Members of the Council: *Chairman,* S. L. Hilton; *Vice-Chairman,* Charles H. LaWall; *Secretary,* E. F. Kelly; H. C. Christensen, H. A. B. Dunning, J. A. Koch, J. H. Beal, W. B. Day, H. V. Arny, T. J. Bradley.

Ex-Officio Members: *President,* D. F. Jones; *First Vice-President,* Ambrose Hunsberger; *Second Vice-President,* A. W. Pauley; *Secretary,* E. F. Kelly; *Treasurer,* C. W. Holton; *Editor of the Journal,* E. G. Eberle; *Editor of the Year Book,* A. G. DuMez; *Chairman of the House of Delegates,* Ambrose Hunsberger.

Sessions: Monday, August 26th, 9:00 A.M.; Thursday, August 29th, 9:00 A.M.; Friday, August 30th, 10:00 P.M.—Reorganization Meeting of the Council.

HOUSE OF DELEGATES OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Officers: *Chairman,* Ambrose Hunsberger; *Vice-Chairman,* Robert L. Swain; *Secretary,* E. F. Kelly.

Sessions: Tuesday, August 27th, 7:30 P.M.; Wednesday, August 28th, 1:30 P.M.; Friday, August 30th, 9:00 A.M., and 7:00 P.M.—Final Session of the House of Delegates.

TUESDAY, AUGUST 27TH, 7:30 P.M.—*First Session.*

1. Roll Call of Delegates.
2. Reception of Fraternal Delegates.
3. Opening Remarks by the Chairman, Ambrose Hunsberger.
4. Appointment of Committee on Nominations.
5. Appointment of Committee on Resolutions.
6. Annual Report of the Council, S. L. Hilton, *Chairman.*
7. Receipt of resolutions, reports and other communications, all of which must be in writing.
8. New Business.

WEDNESDAY, AUGUST 28TH, 1:30 P.M.—*Second Session.*

1. Roll Call of Delegates.
2. Minutes of the First Session.
3. Receipt of reports and other communications from the ASSOCIATION, the Council and the Sections.
4. Receipt of resolutions, reports and other communications, all of which must be in writing.
5. Reports of the Committees on Legislation, on Cosmetics, on Pharmacy Corps in U. S. Army, on the U. S. P., on the Recipe Book and on Survey of Pharmacy and of Pharmaceutical Education.

6. Election of the Honorary President, Secretary and Treasurer of the Association upon nomination of the Council.
7. Report of the Committee on Nominations.
8. Report of the Committee on Place of Meeting.
9. Report of the Committee on Resolutions.
10. Unfinished Business.
11. New Business.

FRIDAY, AUGUST 30TH, 9:00 A.M.—*Third Session.*

1. Roll Call of Delegates.
2. Minutes of the Second Session.
3. Receipt of reports and other communications from the ASSOCIATION, the Council and the Sections.
4. Receipt of resolutions, reports and other communications all of which shall be in writing.
5. Reports of the Committees on Local Branches, on Membership, on Transportation, on Pharmaceutical Syllabus, on Pharmacy Week, on Horticultural Nomenclature, on Physiological Testing, on Weights and Measures, on William Procter, Jr., Memorial Fund, on International Nomenclature, on Standards of Drugs and Chemical Products, on Coöperative Publicity, on Prerequisite Legislation and on Patents and Trade-Marks.
6. Reports of Delegates.
7. Report of the Committee on Resolutions.
8. Unfinished Business.
9. New Business.

FRIDAY, AUGUST 30TH, 7:00 P.M.—*Final Session.*

1. Roll Call of Delegates.
2. Minutes of the Third Session.
3. Receipts of reports and other communications from the ASSOCIATION, the Council and the Sections.
4. Receipt of resolutions, and other communications all of which shall be in writing.
5. Final report of the Committee on Resolutions.
6. Unfinished Business.
7. Installation of the Chairman and Vice-Chairman of the House of Delegates.
8. Final Adjournment.

THE SECTIONS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

SCIENTIFIC SECTION.

Officers: *Chairman*, JAMES C. MUNCH; *First Vice-Chairman*, H. A. LANGENHAN; *Second Vice-Chairman*, W. G. CROCKETT; *Secretary*, L. W. ROWE; *Delegate to the House of Delegates*, PAUL S. PITTENGER.

Sessions: Wednesday, August 28th, 3:30 P.M. Adjourned session, Thursday, August 29th, 9:00 A.M. Adjourned session, Thursday, August 29th, 4:00 P.M. Joint Session with Section on Practical Pharmacy and Dispensing, Thursday, August 29th, 8:00 P.M. Second session, Friday, August 30th, 2:00 P.M.

WEDNESDAY, AUGUST 28TH, 3:30 P.M.—*First Session.*

1. *Chairman's Address.*
2. *Secretary's Report.*
3. *General Business.*

Papers.

4. *Chemistry.*
   "Methylene Blue, U. S. P. as Precipitant of Irish Moss," George E. Ewe.
   "Food as a Preventive Medicine," E. A. Ruddiman.
   "The Mercuration of Phthaleins in Neutral Solution with Bichloride of Mercury," F. R. Greenbaum.
   "Methoxyl Content as a Criterion of the Composition of Creosote," D. V. Sickman and R. P. Fischelis.
   "Aluminum as a Substitute for Zinc in the U. S. P. Test for Arsenic," E. A. Southworth, E. O. Prather, Jr., and W. F. Ambroz.
   "The Rate of Oxygen Adsorption When Carstanjen's Compound Is Treated with Alkali Hydroxide," A. A. Harwood and Edward Kremers.
   "The Inorganic Constituents of Echinacea," S. H. Culter and Edward Kremers.
   "The Heats of Formation of the Alcoholates of Chloral," S. Chechik and Edward Kremers.
   "Cinnamal Hydroxy Sulphonates of the Alkali Metals," S. S. Chao and Edward Kremers.
   "Gleditschia Triacanthos Linné, a Preliminary Report on the Chemistry of the Fruit," Loyd E. Harris.
   "Turkish Rhubarb," R. A. Konnerth and R. E. Schoetzow.

"Assay of Ointment Yellow Mercury Oxide," L. W. Greene and R. E. Schoetzow.

"Quantitative Analytical Methods for the Study of Peroxide Formation in Ether," R. Van Winkle and W. G. Christiansen.

"Catalytic Dehydrogenation of Iso Propyl Alcohol," W. A. Lott and W. G. Christiansen.

"The Preparation of Cyclopropane," W. A. Lott and W. G. Christiansen.

"Studies of the Analysis and Chemistry of Neoarsphenamine. II. Studies on the Chemistry of Sodium Formaldehyde Sulphoxylate and Their Relation to the Structure of Neoarsphenamine," Alfred E. Jurist and W. G. Christiansen.

"An Empiric Assay for Compound Pills of Mercurous Chloride," L. E. Warren.

"Coal Tar Food Colors," Seward E. Owen.

"Amino Alcohols: 4. Reactions with Alkaloidal Reagents," J. C. Munch and W. H. Hartung.

"Amino Alcohols. 5. A Potentiometric Study of Certain Homologues of Ephedrine," John C. Krantz, Jr., and W. H. Hartung.

"Ultraviolet Transmission of Liquids," Ellery H. Harvey.

"Olive Oil, Fluorescence in Ultraviolet Light," L. Deuble and R. E. Schoetzow.

"Reaction between Formaldehyde and Hydrogen Peroxide and a Quantitative Method Based Thereon," Arno Viehoever and K. Shinohara.

ADJOURNED SESSION, THURSDAY, AUGUST 29TH, 9:00 A.M.

5. *Pharmacology and Bio-assays.*

"A Comparison of Methods for Demonstrating Healing of Rickets in the Biological Test for Vitamin D," C. F. Church and J. R. Lockwood.

"Assimilation of Vitamin A When Dissolved in Liquid Petrolatum," B. Moness and W. G. Christiansen.

"The Vitamin Potency of Various Grades of Cod Liver Oil," W. S. Jones and W. G. Christiansen.

"The Effect of Certain Hypoglycemic Drugs upon the Seedlings of Lupinus Albus," John C. Krantz, Jr.

"The Bio-assay of Capsicum and Chillies," J. C. Munch.

"The Anthelmintic Qualities of Pepo and Cucurbita Pepo," James S. Neely and Edward D. Davy.

"Notes on Cascara Sagrada," Milford J. Harris and Edward D. Davy.

"The New Remedy Business: Its Uses and Abuses," F. E. Stewart.

The Assay of Pancreatin," F. E. Willson.

"Critical Remarks on the U. S. P. Pancreatin Assays," F. E. Willson.

"Further Studies of the Cat-Eye Method for the Bio-assay of Mydriatics and Miotics," J. C. Munch.

"Red Squill Powders as Specific Raticides," J. C. Munch, E. E. Horn, J. Silver.

"The Delicacy of Chemical and Physiological Tests for Strychnine," J. C. Munch and J. C. Ward.

"Bio-assay of Aconite and Its Preparations. 2. The Comparative Toxicity of Tincture and Fluidextract of Aconite to Guinea-Pigs and Rats," J. C. Munch and R. I. Grantham.

"Bio-assay of Aconite and Its Preparations. 3. The Pharmacology and Pharmacognosy of Various Species of Aconitum," J. C. Munch and H. H. Crosbie.

"Amino Alcohols. 3. The Potentiation of the Action of Epinephrine by Arylpropanolamines," J. C. Munch and W. H. Hartung.

"An Air Interrupter for Artificial Respiration," A. R. Bliss, Jr., and T. H. Allen.

"Digitalis Assay Standards," L. W. Rowe.

"Studies of Astringency: A Method of Measuring Astringency," E. R. Theis.

"The Pressor Assay of Epinephrine-Novocaine Mixtures," J. C. Munch and W. A. Deckert.

"Effect of Digitoxin on the Heart of Daphnia," Arno Viehoever and A. McReyya.

"Effect of Digitonin on the Heart of Daphnia," Arno Viehoever and M. Teubis.

"Transparent Life," Arno Viehoever.

"The Therapeutic Acitivty of Neoarsphenamine," Alfred E. Jurist and W. G. Christiansen.

"The Pharmacology of Ergot with Respect to Biological Assays and Standards," Marvin R. Thompson.

"Criminal Drug Adulteration," H. W. Ambruster.

ADJOURNED SESSION, THURSDAY, AUGUST 29TH, 4:00 P.M.

6. *Report of Committee on Chairman's Address.*
7. *Report of Committee on Nominations.*
8. *Bacteriology.*
   "A Thought on the Place of Volatile Oils in Plant Economy," Frederick E. Marsh.
   "Report on a Splendid Example of Co-operative Research, Josiah C. Peacock.
9. *Pharmacognosy and Botany.*
   "A Comparison of the Tissue Toxicity and Germicidal Power of Germicides," Lester C. Himebaugh and Emil C. Fanto.
   "Botanical, Pharmacological and Chemical Study of the Root and Stem Bark of Viburnum Rufidulum," H. W. Youngken, James C. Munch and F. J. Amrhein.
   "Medicinal Herbs of the Great Smoky Mountains," K. E. Bennett.
   "Native Drug Plants of Nebraska," E. T. Stuhr.
   "Pacific Coast Drug Plants," E. T. Stuhr.
   "Oregon Drug Plants," E. T. Stuhr.
   "An Investigation of Oregon Grown Peppermint," Alice H. Hayden and E. T. Stuhr.
   "A Phyto-Chemical Study of Pycnanthemum Miticans (Mountain Mint)," H. W. Werner.
   "Polypodium Occidentale. (Licorice Fern)," F. J. Goodrich.
   "A Preliminary Study of the Constituents of Anaphalis Margaritacea," E. C. Baillie and Nellie Wakeman.
   "Comments on U. S. P. X Test for Rhapontic Rhubarb," R. A. Konnerth and R. E. Schoetzow.
   "Black Chokeberry Bark, Aronia melanocarpa var. grandifolia as a Recent Substitute for 'Shonny Haw,'" H. W. Youngken.
   "Study of Peppermint Oil Grown in the State of Washington, "A. A. Levine and C. H. Rayburn.
   "Umbellularia Californica, Nutt," F. A. Nielson and H. M. Burlage.
   "The Seed of Euphorbia Marginata, Pursh.," L. E. Harris and Margaret Gallagher.
   "Histology and Microchemistry of Digitalis Seed," Arno Viehoever and K. Shinohara.
   "Pharmacognosy of Psyllium Seed," Arno Viehoever and E. L. McLaughlin.

Joint Session Scientific Section and Section on Practical Pharmacy and Dispensing.

THURSDAY, AUGUST 29TH, 8:00 P.M.

10. *Report on the U. S. Pharmacopœia,* E. Fullerton Cook.
11. *Report on National Formulary,* Wilbur L. Scoville.
12. *Report on Recipe Book,* E. Leon Lascoff.
13. *Report of Committee on Ebert Prize,* L. W. Rowe.
14. *Symposium on Bacteriology of U. S. P. and N. F.*
   "The Antiseptic Action of U. S. P. and N. F. Ointments," George F. Reddish.
   "Reddish Germicidal Tests on Antiseptics of the U. S. P. and N. F.," I. E. Himebaugh.

FRIDAY, AUGUST 30TH, 2:00 P.M.—*Second Session.*

15. *Pharmaceutical Subjects.*
   "A Study of the Stability of Solution of Arsenous and Mercuric Iodide U. S. P. X," W. J. Husa and W. W. F. Enz.
   "Haziness of Final Chloroformic Extractions in Alkaloidal Assaying," George E. Éwe.
   "The Influence of Light upon the Hydrogen-Ion Concentration and Stability of Certain Pharmaceuticals," John C. Krantz, Jr., and C. Jelleff Carr.
   "Studies on the Acid-Base Equilibrium of Tincture of Digitalis," John C. Krantz, Jr.
   "Effects of Buffering the External Phase upon the Stability of Emulsions," John C. Krantz, Jr.
   "Suggestions Relative to U. S. P. X Revision," Jules Bebie.
   "Comments on Some Tests and Assays of the U. S. P. X," Herbert C. Kassner.
   "VI. The Standardization and Stabilization of Veratrum Preparations: The Hydrogen-Ion Concentration Factor," E. E. Swanson and C. C. Hargreaves.
   "VII. The Standardization and Stabilization of Ergot Preparations: The Hydrogen-Ion Concentration Factor," E. E. Swanson.

"Stability of Anesthetic Ether in Containers of Various Types," E. Van Deripe, L. W. Greene and R. E. Schoetzow.

"The Bellier Test for Sesame Oil," E. Fullerton Cook.

"Renin: Its Deterioration and Comments on the N. F. V Monograph," L. D. Havenhill.

"Evaluation of Pharmaceutical Glassware," N. Storm and James C. Munch.

16. *Reports of Committees.*
17. *Nomination of Officers.*
18. *New Business.*
19. *Unfinished Business.*
20. *Election and Installation of Officers.*
21. *Adjournment.*

SECTION ON EDUCATION AND LEGISLATION.

Officers: *Chairman*, A. L. I. WINNE; *Vice-Chairman*, L. D. HAVENHILL; *Secretary*, GLENN L. JENKINS; *Delegate to House of Delegates*, M. N. FORD; *Alternate Delegate*, CHARLES F. POE.

Sessions: Thursday, August 29th, 9:00 A.M.; Friday, August 30th, 2:30 P.M.

THURSDAY, AUGUST 29TH, 9:00 A.M.—*First Session.*

1. *Chairman's Address*, A. L. I. Winne.
2. *Secretary's Report*, Glenn L. Jenkins.
3. *Papers.*

"The Parker Bill," E. F. Kelly.

"Educating the Public on the Profession of Pharmacy," D. B. R. Johnson.

"The Proposed Transfer of Prohibition Enforcement from the Treasury Department to the Department of Justice," James H. Beal.

"Student Branches of the A. PH. A.," B. V. Christensen.

"Pharmacy Needs an Objective Policy," Robert L. Swain.

"Teacher Training in Pharmacy," E. T. Motley.

"What the Food, Drug and Insecticide Administration Is Doing for Pharmacy," L. E. Warren.

"What the Pharmacist May Do for Himself," E. C. Brokmeyer.

4. *Appointment of Committee on Nominations.*

FRIDAY, AUGUST 30TH, 2:30 P.M—*Second Session.*

Papers.

"Bromatotherapy and the Drug Store," L. F. Kebler.

"The Neighborhood Store—How to Train Men for It," Wortley F. Rudd.

"The Pharmacy Corps Bill," S. L. Hilton.

"Many Candidates Fail State Board Examinations in District No. 3. Why?," Rudolph H. Raabe.

"Comments on the Revocation of Permits Issued under the National Prohibition Act," W. Bruce Philip.

"The Junior College in Relation to Pharmaceutical Education," Frederick J. Wulling.

"Summary of Regulations Governing the Sale of Drugs and Medicines in Sweden," Knut Sjöberg.

5. *Report of Committees.*
6. *Unfinished Business.*
7. *Election of Officers.*
8. *Adjournment.*

SECTION ON PRACTICAL PHARMACY AND DISPENSING.

(Pharmacopœias, Formularies and Standards.)

Officers: *Chairman*, P. H. DIRSTINE; *Vice-Chairman*, E. O. LEONARD; *Secretary*, H. C. NEWTON; *Delegate to House of Delegates*, H. A. LANGENHAN.

Sessions: Thursday, August 29th, 9:00 A.M.; Thursday, August 29th, 8:00 P.M., Joint Session with the Scientific Section; Friday, August 30th, 2:30 P.M.

THURSDAY, AUGUST 29TH, 9:00 A.M.—*First Session.*

1. *Chairman's Address*, P. H. Dirstine.
2. *Secretary's Report*, H. C. Newton.
3. *General Business.*

The papers of this Section will be re-arranged in the Official Program.

4. *Papers.*

"Preparation of Enteric-Coated Capsules," S. L. Hilton.

"A Survey of the Prescription Business in the City of Buffalo," Leon Monell.

"Prescription Bottles," William J. Husa.

Subject to be announced, Robert J. Ruth.

"A New Explanation of an Old Incompatibility—That between Glycerin and Sodium Borate," Charles W. Bauer.

"A Method for the Quantitative Estimation of Chloroform in Chloroform Liniment," Alfred C. Andersen.

"A Prescription Containing Guaiac and Acacia," John C. Krantz, Jr., and C. Jelleff Carr.

"A Further Study of the Incompatibility between Sodium Bicarbonate and Sodium Salicylate," John C. Krantz, Jr., and C. Jelleff Carr.

"Who Is to Blame?" J. Leon Lascoff.

5. *Appointment of Committees.*

Joint Session with Scientific Section and Section on Practical Pharmacy and Dispensing.

Session: Thursday, August 29th, 8:00 P.M.

For Program—See Program of Scientific Section.

FRIDAY, AUGUST 30TH, 2:30 P.M.—*Second Session.*

"Preparation of Ampuls," S. L. Hilton.

"Clinical Laboratory Work a Prescription Aid," Lee S. Coy.

"Pharmaceutical Practicalities," Robert J. Ruth.

"Physicians' Prescriptions in Relation to the U. S. P. and N. F. Preparations," P. J. Kolb.

"A National Pharmacy Welfare Fund," Edward Swallow.

"The Manufacture and Dispensing of U. S. P. Digitalis Preparations," Robert P. Fischelis.

"Commercial Aspects of Professional Pharmacy," H. S. Noel.

6. *Unfinished Business.*
7. *Reports of Standing Committee. Committee on Creation of Pharmacy Flag.*
8. *Report of Committee on Nominations.*
9. *Election and Installation of Officers.*
10. *Adjournment.*

Order of program subject to change.

SECTION ON COMMERCIAL INTERESTS.

Officers: *Chairman,* R. B. ROTHROCK; *Vice-Chairman,* DENNY BRANN; *Secretary,* JOSEPH G. NOH; *Delegate to the House of Delegates,* C. LEONARD O'CONNELL.

Sessions: Wednesday, August 28th, 3:30 P.M.; Thursday, August 29th, 8:00 P.M.

WEDNESDAY, AUGUST 28TH, 3:30 P.M.—*First Session.*

1. *Chairman's Address,* R. B. Rothrock.
2. *Report of Secretary,* Joseph G. Noh.
3. *Appointment of Committees.*
4. *General Business.*
5. *Papers.*

"An Old-Fashioned Drug Store in a Modern Setting," Thomas Roach.

"The Ethics of Commercialism," V. C. Michels.

"Dividing Your Inventory to Find Your Proper Rate of Turnover," W. Bruce Philip.

"The Independent Retail Drug Store—A National Necessity," R. F. Lee Williamson.

"Activities of Druggists Research Bureau, E. L. Newcomb.

"A Five-Foot Shelf of Journals," E. H. Niles.

"Discussions on Business Subjects."

THURSDAY, AUGUST 29TH, 8:00 P.M.—*Second Session.*

Papers.

"The Ethics of Commercialism," V. C. Michels.

"Difference between Yugoslavian and American Drug Stores," Alexander D. Tchalovsky.

"Why Not Establish a Regular Fee for the Pharmaceutical Profession?" Edward Swallow.

"Discussion on Business Subjects."

"Shall the Independent Druggist Sink or Swim? It Depends upon His Initiative and Effort," H. W. Heine.

"Keeping Independent," Edward S. Rose.

6. *Reports of Committees.*
7. *Unfinished Business.*
8. *Election and Installation of Officers.*
9. *Adjournment.*

SECTION ON HISTORICAL PHARMACY.

Officers: *Chairman,* LYMAN F. KEBLER; *Secretary,* GEORGE D. BEAL; *Delegate to House of Delegates,* AMBROSE MUELLER; *Historian,* E. G. EBERLE.

Sessions: Wednesday, August 28, 3:30 P.M.; Thursday, August 29th, at 9:00 A.M.

PROGRAM.

WEDNESDAY, AUGUST 28TH, 3:30 P.M.—*First Session.*

1. *Chairman's Address,* "The First Professor of Chemistry and Pharmacy of the South Dakota State College," Lyman F. Kebler.

2. *Secretary's Report*, George D. Beal.
3. *Report of the Historian*, E. G. Eberle.
4. *Appointment Committee on Nominations.*
5. *Papers.*

"Physics in Pharmacy, Part II," John Uri Lloyd, Wolfgang Ostwald and Walter Haller.

"History of Sharp & Dohme, 1845–1929," Alfred R. L. Dohme.

"Reminiscences of Early Pharmacy in Baltimore," David M. R. Culbreth.

"Writing Pharmaceutical Biography and History," Edward Kremers.

"Tom, the Doctor's Apprentice," Edward Kremers.

"Flueckigeriana, IV: Lloyd's Conference with Flueckiger in New York," Edward Kremers.

"LeMort's Pharmacia," Edward Kremers.

"Kava Kava (Piper methysticum). Its Ceremonial Uses in the Samoan Islands," John Thomas Lloyd.

"The Birth of the Scientific Journal," Fred B. Kilmer.

THURSDAY, AUGUST 29TH, 9:00 A.M.—*Second Session.*

6. *Editor's Report of Progress, History of American Pharmacy*, Clyde L. Eddy.

Papers.

"History of the Illinois Pharmaceutical Association," W. B. Day.

"Reciprocity in Pharmaceutical Licensure," H. C. Christensen.

"Pharmacy in West Virginia," Roy B. Cook.

"Pharmaceutical History Is Being Made," Robert J. Ruth.

Title to be announced, Frederick J. Wulling.

"Three Pioneers and Their Activities in Initiating Federal Food and Drug Legislation," Lyman F. Kebler.

"George Thorndike Angell, the Fearless Pioneer for Pure Food and Drugs, and the Friend of Those Who Could Not Speak for Themselves," Lyman F. Kebler.

"Medical and Pharmaceutical Knowledge of Balzac," L. E. Warren.

"Garcia da Orta and the First Description of Asiatic Plant Drugs by a European," Louis H. Roddis.

"A Half Century of Pharmacy in Kansas," Mathias Noll.

"Gmelin, a German Family of Pharmacists, Chemists and Botanists," Otto Raubenheimer.

"Pharmacy in Classical Antiquity," Leo R. A. Suppan.

7. *Reports of Committees.*
8. *New Business.*
9. *Unfinished Business.*
10. *Election and Installation of Officers.*
11. *Adjournment.*

PLANT SCIENCE SEMINAR.

August 19 to August 23, 1929, at the Game Lodge in Custer State Park, Rapid City, South Dakota.

Officers: *Chairman*, C. E. F. MOLLETT; *Secretary*, O. P. M. CANIS.

MONDAY, AUGUST 19TH.

10:00 A.M. "Greetings and Registration."
Meeting of the Entertainment Committee: E. N. Gathercoal, E. R. Serles, E. B. Fischer.
General "Get Together" Meeting.
Luncheon.
2:00 P.M. "Welcome to the West," by President D. F. Jones of the A. PH. A.
"Welcome to South Dakota," by Dr. C. C. O'Harra, President of So. Dakota School of Mines.
"Introduction of Representatives and Delegates."
"Opening Address," by the Chairman C. E. F. Mollett.
Exploring of Camp and Surrounding Territory.
6:00 P.M. Dinner.
8:00 P.M. Camp Fire Stories and Singing.

TUESDAY, AUGUST 20TH.

9:00 A.M. "Address" by Dr. E. L. Newcomb. Founder of the Seminar and Secretary.
"Flora of the Black Hills," by Prof. A. C. Mackintosh, Head of the Department of Biology of the So. Dakota School of Mines.
"Talk on the Geology of the Black Hills."
Luncheon.
Exhibition of Specimens for Exchange.

2:00 P.M. Field Trip—Collection of Specimens and Sight-Seeing, Leaders: Messrs. Mackintosh, Rang and Petry.
6:00 P.M. Dinner.
8:00 P.M. Camp Fire Stories.

WEDNESDAY, AUGUST 21ST.

9:00 A.M. Report of the Committee of the National Research Council on Pharmaceutical Botany and Pharmacognosy by Chairman H. W. Youngken.
Color Nomenclature of the U. S. P. and N. F. (further studies) by E. N. Gathercoal.
Discussion opened by Messrs. Fischer, Darbaker, Viehoever, Schwartz and Bacon.
Luncheon.
2:00 P.M. Field and Collecting Trip, Leaders: Messrs. Mackintosh, Rang and Petry.
6:00 P.M. Fish Fry and Lunch in the Hills.
8:00 P.M. Informal Dancing in the Pavilion.

THURSDAY, AUGUST 22ND.

9:00 A.M. "Ecology and Pharmacognosy," by Prof. O. P. M. Canis.
Discussion opened by Messrs. Youngken, Mollett, and Christensen.
"Medicinal Flora of Montana and the Yellowstone Park," by C. E. F. Mollett.
"A Glossary of Histological Terms," by Heber W. Youngken.
Discussion opened by Messrs. Canis, Plitt, Gathercoal, Wirth and Mollett.
Luncheon.
2:00 P.M. Collection Trip and visit to the South Dakota School of Mines. Inspection of Herbarium. Invitation of Dr. C. C. O'Harra of the School of Mines. Leader: Prof. Mackintosh.
Dinner and Theater in Rapid City.

FRIDAY, AUGUST 23RD.

9:00 A.M. "Tropical Drug Plants (illustrated)," by B. V. Christensen.
"Medicinal Plants of Northern Ohio," by F. J. Bacon.
11:00 A.M. Business Meeting.
Report of Secretary and Committees.
Unfinished Business.
New Business.
Election of Officers.
Adjournment.
Luncheon.
The afternoon will be devoted to preparing and packing of specimens for shipping. (Driers and packing material will be available.) Return to Rapid City in the evening, to be ready for the meeting of the National Research Conference at the School of Mines, Saturday, 8:30 P.M.

NATIONAL CONFERENCE ON PHARMACEUTICAL RESEARCH.

The eighth annual meeting of the National Conference on Pharmaceutical Research will be held at the School of Mines, Rapid City, S. D., on Saturday, August 24, 1929. The opening session of the Conference will begin at 9:30 A.M.

The order of business will be as follows:

1. Roll Call.
2. Report of Officers.
3. Conferences of the Standing Committees, 10 A.M. to 12:30 P.M.
4. Reports of the Standing Committees.
5. Report of Special Committee on Color Standards.
6. Report of Special Committee on Book of Research Achievements.
7. Report of the Special Committee on Ways and Means and on Expansion.
8. Action on proposed changes in Constitution and By-Laws (see Bulletin No. 5).
9. Reports and Greetings from Delegates from Affiliated Organizations *viz.:*
   (*a*) Association of Official Agricultural Chemists.
   (*b*) American Association of Colleges of Pharmacy.
   (*c*) American Drug Manufacturers' Association.
   (*d*) AMERICAN PHARMACEUTICAL ASSOCIATION.
   (*e*) American Pharmaceutical Manufacturers' Association.
   (*f*) Bureau of Chemistry, U. S. Department of Agriculture.

(*g*) Druggists' Research Bureau.
(*h*) Hygienic Laboratory, U. S. Public Health Service.
(*i*) National Association of Boards of Pharmacy.
(*j*) National Association of Retail Druggists.
(*k*) National Formulary Revision Committee.
(*l*) National Wholesale Druggists Association.
(*m*) Pharmaceutical Laboratory Seminar.
(*n*) Plant Science Seminar.
(*o*) Proprietary Association.
(*p*) U. S. P. Revision Committee.

10. Reports on and discussions of:
(*a*) Census of Research.
(*b*) Graduate Students in Pharmacy and their Research Work.
(*c*) Research Grants and Prizes.
(*d*) Research Fellowships and Scholarships.
11. New Business.
12. Election.
13. Adjournment.

CONFERENCE OF PHARMACEUTICAL ASSOCIATION SECRETARIES.

AUGUST 28–29, 1929.

WEDNESDAY, AUGUST 28TH, 4:30 P.M.—*First Session.*

1. Call to Order.
2. Calling of Roll.
3. Address of President, John Culley.
4. Report of Secretary-Treasurer, J. G. Noh.
5. Reports of Officers and Committees.
6. Election of Members.
7. Paper—"Commercial Clinics for State Associations," by J. G. Beard, North Carolina.
8. Round Table Discussions on: "How to Increase and Hold Membership," to be led by C. J. Clayton, Colorado.
9. "New Services for Members" to be led by W. Bruce Philip, California.

THURSDAY, AUGUST 29TH, 4:30 P.M.—*Second Session.*

1. Reading of Minutes.
2. Unfinished Business.
3. Paper—"How Association Secretaries May Help Secure Commissions in the U. S. Army for Pharmacists," by A. L. I. Winne, Virginia.
4. Round Table Discussions on: "Merging Associations," to be led by W. D. Adams, Texas.
5. "Auxiliary Membership in State Associations," to be led by W. E. Bingham, Alabama.
6. "The Unit Plan" to be led by W. H. Lamont, Missouri.
7. "Legislative Activity of State Associations," to be led by R. P. Fischelis, New Jersey.
8. Election and Installation of Officers.
9. Adjournment.

ANNUAL JOINT MEETING OF THE EXECUTIVE COMMITTEES OF N. A. R. D. AND OF A. PH. A.

The annual Joint Meeting of the Executive Committees of the National Association of Retail Druggists and of the AMERICAN PHARMACEUTICAL ASSOCIATION will be held at Alex Johnson Hotel, Rapid City, Tuesday, August 27th, at 3:00 P.M.

INFORMAL CONFERENCE U. S. P. REVISION COMMITTEE MEMBERS AND BOARD OF TRUSTEES.

An Informal Conference of members of the Revision Committee of United States Pharmacopœia and Board of Trustees has been called by Chairman E. Fullerton Cook, for Tuesday evening, August 27, 1929, at 9:30 P.M. at Rapid City.

KANSAS PHARMACY LAW REGISTRATION REQUIREMENTS.

Secretary Roy C. Reese of Kansas Pharmaceutical Association calls attention that all drug clerks, who had had six months or more experience previous to May 28th and who wish to be eligible to take the Kansas State Board examination under the old law within the next five years, must fill out an apprentice application—the blue one supplied by A. H. King, Secretary of the State Board—and have it back in his hands by August 28th. These apprentice applications are for citizens of Kansas only, as the new law applies now to those not residents of Kansas. All registered assistants who have not served two years as an assistant should register as an apprentice if they wish to take the examination for full registration before the two years are up. The State Board allows everyone with four year's experience to take the full registration examination regardless of whether they are registered assistants or not.

STATE PHARMACEUTICAL ASSOCIATIONS.

Brief reports of the meetings of State pharmaceutical associations follow; these reports were begun in the June number and will be concluded in a succeeding issue of the JOURNAL. In most instances only the names of the officers are given, which are permanently placed in the roster in the Advertising Section. Instead of giving the full title of the State Association only the name of the State is given in this and succeeding reports. We will thank members to report errors.

CONNECTICUT.

A Veteran Druggists' Association was organized during the annual meeting of the Connecticut Pharmaceutical Association held at Bridgeport, June 26th–27th.

The following officers were elected:

President, John E. F. Jones, Bridgeport.

First Vice-President, George Rapport.

Second Vice-President, Hugh Beirne, New Haven.

Secretary-Treasurer, P. J. Garvin, New Haven, reëlected.

FLORIDA.

Florida Pharmaceutical Association held its annual meeting at Hotel Princess Martha, St. Petersburg. President Stephens urged a committee of five to formulate a model pharmacy law for introduction in the next session of the Legislature. He recommended that active support be given to the A. PH. A. Headquarters and to the Bill for a Pharmacy Corps in the U. S. Army.

Prof. John L. Shearer addressed the Convention on "Past and Present Problems of Pharmacy."

The following were elected officers for the ensuing year:

President, William Enrich, Orlando.

First Vice-President, Harry Childs, St. Petersburg.

Second Vice-President, R. G. Richards, Ft. Myers.

Third Vice-President, N. S. Avinger, Jacksonville.

Secretary, L. J. Taylor, Eustes.

Key West was chosen for the 1930 meeting of the Association.

INDIANA.

The 148th annual meeting of Indiana Pharmaceutical Association convened at Lake Wawasee, June 18th–20th. Four hundred druggists were registered.

The following officers were elected:

President, C. E. Nelson, Hammond.

First Vice-President, E. H. Miller, Ft. Wayne.

Second Vice-President, Mary Forsythe, N. Manchester.

Third Vice-President, Asa E. Smith, Logansport.

Secretary, Frank V. McCullough, New Albany, reëlected.

Treasurer, J. W. Weis, Hammond.

KENTUCKY.

The 52nd annual convention of Kentucky Pharmaceutical Association was held at Crab Orchard Springs.

The following were elected officers for the ensuing year:

President, Frank B. Davis, Louisville.

First Vice-President, W. H. Paynter, Louisville.

Secretary, J. W. Gayle, Frankfort, reëlected.

Treasurer, William J. Johnson, Mayfield, reëlected.

The newly elected President of the Association is President of the College of Pharmacy of the University of Louisville and also of the Louisville Druggists' Association.

MAINE.

Maine Pharmaceutical Association endorsed the bill for the Pharmacy Corps in the U. S. Army. A committee was provided for making a survey of Maine druggists to determine the support which would be given to the proposed establishment of a Department of Pharmacy at the University of Maine. In his address President Charles S. Pierce recommended that the pharmacy law be so amended that reciprocity may be had with other states.

The following are the officers for the ensuing year:

President, Francis F. Frawley, Bangor.

First Vice-President, Lewis A. Barrows, Newport.

Second Vice-President, Roy M. Hescock, Monson.

Third Vice-President, Leon H. Marr, Farmington.

Treasurer, Dr. M. L. Porter, Danforth.

Secretary, James H. Allen, Waterville.

MASSACHUSETTS.

Among the speakers at the Massachusetts State Pharmaceutical Association meeting held at Swampscott, June 11th–13th, were James F. Finneran, Wm. R. Acheson, President Herbert M. Lerou of the N. A. B. P., The latter discussed the four-year college of pharmacy course.

The following officers were elected for the ensuing year:

President, Anthony Alteri, Springfield.

Vice-Presidents, T. Willard Burke, Lynn; Joseph F. Sisson, Boston.

Treasurer, Lyman W. Griffin, Allston.

Secretary, Carl G. A. Harring, Dorchester.

MISSISSIPPI.

Dr. E. L. Hammond was elected delegate to the AMERICAN PHARMACEUTICAL ASSOCIATION by the Mississippi Pharmaceutical Association. E. C. Brokmeyer spoke on "The Necessity of Publicity for Pharmacy" and emphasized that organizations cannot accomplish much without persistent, effective publicity. The meetings were held at the Grand Southern Hotel, Gulfport.

The following were elected officers for the ensuing year:

President, Charles E. Wilson, Corinth.

First Vice-President, T. D. Chilton, Vicksburg.

Second Vice-President, Walter N. Temple, Bude.

Secretary-Treasurer, A. S. Coody, Jackson.

Vicksburg was chosen for the meeting in 1930.

NORTH CAROLINA.

The Golden Anniversary meeting of the North Carolina Pharmaceutical Association was held in Asheville.

Among the addresses of the convention were "Why Wait for the Customers" by Turner F. Currens; "Pharmacists Must Return to the Practice of Pharmacy if the Calling Is to Endure," by Dean A. G. DuMez. Charles Stevens gave an illustrated lecture on "How Biologicals Are Made," through the courtesy of Parke, Davis & Co. Secretary J. C. Beard gave an illustrated, historical account of the men who have contributed to the origin, development and growth of the North Carolina Pharmaceutical Association.

Gold badge buttons were presented to the five living charter members: E. V. Zoeller, Tarboro; F. W. Hancock, Oxford; John H. Hardin, Wilmington; F. R. Hood, Smithfield; H. R. Horne, Fayetteville. Mr. Horne celebrated his 90th birthday July 7th; in the words of Secretary Beard "the gallant old gentleman exemplifies the finest traditions of manhood, of citizenship and of professional practice."

Secretary J. G. Beard, who has served the Association as Secretary for seventeen years, was presented with a gold watch.

Among the papers presented during the meeting were the following: "The History of Soap" by E. V. Kyser; "A Comparative Study of the Absorptive Powers of Activated Carbons and Animal Chars" by M. L. Jacobs and "The Trend of Pharmacy" by Miss Mattie E. Smith of Charlotte.

The following officers, elected by mail ballot, were installed: *President*, C. C. Fordham, Sr., Greensboro; *Vice-Presidents*, C. D. Miller, Goldsboro; Carl T. Durham, Chapel Hill; G. A. Iseley, Raleigh; *Secretary-Treasurer*, J. G. Beard, Chapel Hill, reëlected.

North Carolina has two sections within the Association, namely, the Proprietors', and the Clerks' Section. Of the former, H. M. Cooke, of Spencer, is the *Chairman*, and the *Vice-Chairman* is S. E. Welfare, of Winston-Salem; the *Secretary* is Joseph Hollingsworth of Mt. Airy. The officers of the latter section are: *Chairman* F. H. Scroggs, Franklin; and the *Secretary*, G. O. Tripp, Tarboro.

The following nominations for the officers of 1930–31 were made; the election will be by mail ballot:

President, Sam Carter, Salisbury and C. B. Miller, Goldsboro.

First Vice-President, H. M. Cooke, Spencer and J. C. Hood, Kinston.

Second Vice-President, G. A. Iseley, Raleigh, and P. A. Walker, Charlotte.

Third Vice-President. Fred Hester and Miss Mattie E. Smith, Charlotte.

Secretary-Treasurer, J. G. Beard, Chapel Hill, and E. F. Rimmer, Charlotte.

Raleigh was selected for the next place of meeting.

NEW HAMPSHIRE.

Governor Charles W. Tobey was among the speakers at the New Hampshire Pharmaceutical Association meeting. The address of

President Rodney A. Griffin was comprehensive, dealing with the subjects in which pharmacists are most concerned at the present time. Dean Theodore J. Bradley represented the A. PH. A. and James F. Finneran spoke for the N. A. R. D.

The following were elected officers for the ensuing year:

President, J. Albert Nault, Claremont.

First Vice-President, E. L. Putnam, Concord.

Second Vice-President, Leo. L. Desparte, Lebanon.

Treasurer, Edward E. Goulet, Manchester.

Secretary, H. R. Hutchinson, Concord.

Auditor, H. R. Rice, Nashua.

OHIO.

The outstanding features of the convention of the Ohio State Pharmaceutical Association were the addresses of Dr. H. V. Arny and Prof. Paul C. Olsen. The former spoke on "Organizing the Prescription Pharmacists," and the latter dealt with the work being done by the Druggists' Research Bureau. James F. Finneran spoke for the N. A. R. D.

The following delegates represented the A. PH. A.: James H. Beal, H. V. Arny, F. H. Freericks, M. N. Ford and Edward Spease.

The Cleveland News issued a special convention number. Among the resolutions adopted are the following:

A bill for the establishment of a Pharmacy Corps in the U. S. Army, the Capper-Kelly Fair Trade Bill. It was voted that the Legislative Committee prepare a bill for introduction into the Legislature—that the name of the pharmacists in charge of drug stores shall be displayed in the store. An engrossed copy of the Code of Ethics of the Ohio State Pharmaceutical Association will be furnished to every member for posting in the drug store.

The following were elected officers for the ensuing year:

President, John C. Rutledge, Akron.

First Vice-President, William Ludwig, Toledo.

Second Vice-President, J. W. Darr, Girard.

Treasurer, L. W. Funk, Columbus.

Secretary, Theodore D. Wetterstroem, Columbus.

The following were elected delegates to the U. S. P. and AMERICAN PHARMACEUTICAL ASSOCIATION conventions: Frank H. Freericks, F. H. King and M. N. Ford. Frank H. Freericks was selected as the voting delegate in the House of Delegates, A. PH. A.

OREGON.

Dean A. O. Mickelsen addressed the Oregon Pharmaceutical Association on "Entomology for the Pharmacist." He advocated side lines in the pharmacy of preparations and products that are closely related to pharmacy.

The movement was set on foot to hold a tri-state association meeting of the Oregon, Washington and Idaho associations.

The address of President Matthieu was comprehensive in reviewing conditions of to-day. He urged support of the state loan fund for pharmacy students.

The officers elected for the ensuing year are:

President, S. R. Stevenson, Eugene.

First Vice-President, John Witty, Portland.

Second Vice-President, George Steelhammer, Silverton.

Third Vice-President, Harry L. Weis, Salem.

Secretary, Frank S. Ward, Portland.

Treasurer, John Laue, Jr., Portland.

SOUTH CAROLINA.

Among the speakers at the South Carolina Pharmaceutical Association held at Columbia, June 26th–27th, were Lieutenant-Governor, Thomas B. Butler, and John A. Goodbe, representing the N. A. R. D.

The officers for the ensuing year are:

President, Herbert F. Dunning, Sommerville.

Vice-Presidents, Carl M. Gibson, Columbia and C. G. McElveen, Lake City.

Secretary-Treasurer, Frank M. Smith, elected for the 30th consecutive time.

VERMONT.

Theodore J. Bradley, represented the AMERICAN PHARMACEUTICAL ASSOCIATION at the Vermont meeting held at Lake Champlain Club, June 17th–18th. Among the speakers were Jerry McQuade whose subject was "Fitting Your Job." James F. Finneran discussed "Why Some Druggists Succeed." Robert J. Ruth delivered an illustrated lecture on "Sunshine from the Sea." Another illustrated lecture was by C. E. Maire on "The Production and Preservation of Biologicals."

The following were elected officers for the ensuing year:

President, W. H. Brown, Derby Line.

First Vice-President, Gerald Gray, Enosburg Falls.

Second Vice-President, J. W. Blakely, Montpelier.

Third Vice-President, Ellis Parry, Vergennes.

Secretary-Treasurer, Welcome B. Eastman, St. Johnsbury.

VIRGINIA.

Among the speakers at the Virginia Pharmaceutical Association meeting held at the Chamberlain-Vanderbilt Hotel were E. F. Kelly, Secretary of the A. PH. A.; Frank T. Stone, as representative of the N. A. R. D.; Prof. Paul C. Olsen spoke on "The Work of the Druggists' Research Bureau;" Dr. John Bell Williams of the McGuire Clinic spoke on "How to Conduct a Hospital Pharmacy."

The Commercial Section was under the direction of Chairman W. G. Crockett who led the program on "Case Studies of the Druggists' Research Bureau." Business statements were analyzed and discussed in detail.

The officers for the ensuing year are:

President, J. W. Williamson, Harrisonburg.

Vice-Presidents, H. S. Falconer, Newport News; G. E. Heller, Bedford; C. W. Powers, Roanoke; W. H. Hoover, Richmond; J. O'K. Peery, Norton; E. V. Greever, Chilhowie.

Secretary-Treasurer, A. L. I. Winne, Richmond.

Richmond was selected as the place for the 1930 meeting.

DR. JOSÉ GUILLERMO DIAZ.
Havana, Cuba.

Dr. Diaz translated the U. S. Pharmacopœia VIII and IX into Spanish; the present edition is also printed in Spanish; it is officially recognized by Cuba and every pharmacy in the Republic is required by law to have a copy. Dr. Diaz has been a member of the AMERICAN PHARMACEUTICAL ASSOCIATION since 1904.

WISCONSIN.

Among the speakers from outside of the state, at the meeting of the Wisconsin Pharmaceutical Association were President Denny Brann of the N. A. R. D. and W. Bruce Philip. H. S. Noel of Indianapolis spoke on "Can the Independent Retailer Survive?" The subject of Clyde L. Eddy's address was "Chain Stores in the Drug Field."

The following were elected officers for the ensuing year:

President, Dr. Edward Kremers, Madison.

First Vice-President, Clarence Andrae, Adams.

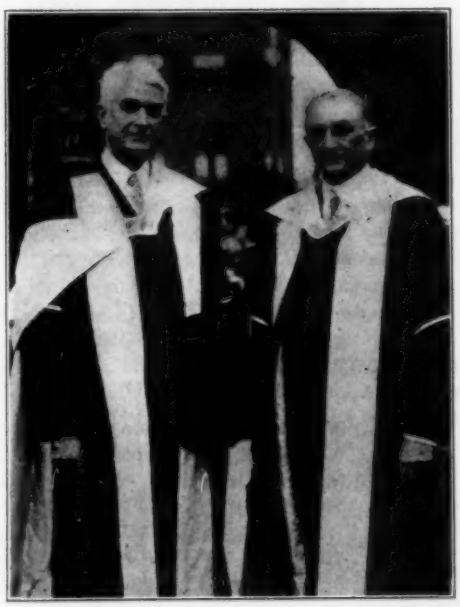
Second Vice-President, George Miller, Caddock.

Third Vice-President, Charles F. Geisse, Fond du Lac.

Secretary, E. B. Heimstreet, Lake Mills.

Treasurer, H. Tusson, Milwaukee.

Madison was chosen for the convention of 1930.



Dr. William J. Mayo (left) and Dr. Charles H. Mayo (right) who received the Honorary Degrees of Doctor of Laws from Manchester University during the Annual Meeting of the British Medical Association. Dr. Charles H. Mayo will be one of the speakers at the Rapid City meeting of the AMERICAN PHARMACEUTICAL ASSOCIATION.

The Minneapolis Executive Committee in charge of arrangements for N. A. R. D. meeting.

LEGAL AND LEGISLATIVE.

THE SMOOT BILL—S. 1468 SEEKS TO AMEND THE FOOD AND DRUGS ACT.

Senate Bill No. 1468 seeks to amend the Food and Drugs Act, including tobacco, and control of advertising. As printed in the Congressional Record of June 10th, the Bill reads:

Whereas the manufacture and sale of tobacco products are matters that affect the public health and welfare of millions of our population; and

Whereas various drug products are contained in tobacco; and

Whereas, because tobacco now abandoned as a medicinal agent is no longer classified as a drug, and thus escapes, through a technicality, the controls set up in the food and drugs act adopted by Congress for the protection of public health; and

Whereas public health would be better served by empowering the Food, Drug, and Insecticide Administration of the United States Department of Agriculture to exercise the same control over false and deceptive statements made through advertising media, that it now exerts in preventing the use of false and deceptive statements, designs, or devices made on containers or labels: Now, therefore

Be it enacted, etc., That the food and drugs act, June 30, 1906, as amended August 23, 1912; March 3, 1913; March 4, 1913; July 24, 1919; and January 18, 1927, be, and is hereby, further amended as follows:

The words "food or drug," "food or drugs," or "food and drugs," as the case may be, wherever they occur in Sections 1, 2, 3, 4 and 11 of the act of June 30, 1906 (34 Stat. 768), as

amended, are changed to read "food, drug, tobacco, or tobacco products."

SEC. 2. Section 6 of the act of June 30, 1906 (34 Stat. 768) is amended by adding at the end thereof the following:

"The term 'tobacco' means the leaves of the plant *Nicotiana tabacum*. The term 'tobacco products' means the products from tobacco prepared for smoking, chewing or snuffing."

SEC. 3. Section 7 of the act of June 30, 1906 (34 Stat. 768) is amended by adding at the end thereof the following:

"In the case of tobacco:

"If it contains any added deleterious or added poisonous substance."

SEC. 4. The first general paragraph of section 8 of the act of June 30, 1906 (34 Stat. 768) is amended to read as follows:

"That the term 'misbranded,' as used herein, shall apply to all drugs, articles of food, tobacco or tobacco products, or articles which enter into the composition of food or tobacco products, the package or label of which shall bear any statement, design or device regarding such article, or the ingredients or substances contained therein, which shall be false or misleading in any particular, and of any food, drug products, tobacco or tobacco products which is falsely branded as to State, Territory or country in which it is manufactured or produced."

SEC. 5. Section 8 of the act of June 30, 1906 (34 Stat. 768) is hereby further amended by adding immediately following paragraph third of the section beginning "in case of drugs," the following new paragraph:

"Fourth. If, in any manner or by any means whatsoever, it or they, or the ingredients or substances contained therein, are falsely or deceptively advertised, represented or described, or if the curative or therapeutic effects of a product or the ingredients or substances contained therein are falsely and fraudulently advertised, represented or described."

SEC. 6. Section 8 of the act of June 30, 1906 (34 Stat. 768) is hereby further amended by adding immediately following at the end of the second proviso of paragraph 4 "in the case of food" a new paragraph as follows:

"Fifth. If, in any manner or by any means whatsoever, it or they or the ingredients or substances contained therein are falsely or deceptively advertised, represented or described."

SEC. 7. Section 8 of the act of June 30, 1906 (34 Stat. 768), as amended, is further amended by adding immediately after the complete new section dealing with drugs the following new section dealing with tobacco or tobacco products:

"In the case of tobacco or tobacco products:

"First. If labeled or branded so as to deceive or mislead the purchaser or purport to be a foreign product when not so or if the contents of the package as originally put up shall have been removed in whole or in part or other contents shall have been placed in such package.

"Second. If the package containing it or them or its or their label shall bear or contain any statement, design or device regarding the ingredients or substances contained therein which statement, design or device shall be false or misleading in any particular.

"Third. If, in any manner or by any means whatsoever it or they or the ingredients or substances contained therein are falsely or deceptively advertised, represented or described."

SEC. 8. The words "food, drug or liquor" in the first line of Section 10 of the act of June 30, 1906 (34 Stat. 768) be changed to read "food, drug, liquor, tobacco or tobacco products."

THE INCREASED DUTY ON BLACKSTRAP MOLASSES AFFECTS THE PRICE OF ALCOHOL.

The Senate will reconvene August 19th. Information relating to the effect of increased duty on blackstrap molasses on the price of alcohol will be gained by reading an address in Congress by Representative Hudson; copy may be obtained by addressing Secretary E. L. Newcomb, 51 Maiden Lane, New York City. The following is reprinted from *N. W. D. A. Bulletin*, No. 179:

"While the allied alcohol-using trades were able to prevent the amendment of the Tariff Bill in the House of Representatives so as to provide an increase in the duty on blackstrap molasses from one-sixth of one per cent per gallon to eight cents, which would have meant an increase in the cost of alcohol to the consuming industries of 25 or 30 cents per gallon, they are now faced by a similar threat in the Senate Finance Committee. Senator Broussard of Louisiana, representing the sugar producers of that state, has introduced an amendment raising the duty on blackstrap molasses intended for the distillation of alcohol to four cents per gallon which would represent an increase in the distillery cost of industrial spirits

of approximately 11 cents per gallon, or the equivalent of 15 or 16 cents per gallon in the price to be paid by consuming manufacturers.

"All our members *should immediately address telegrams to Hon. Reed Smoot, Chairman of the Senate Finance Committee, and to their own Senators protesting urgently against the proposed increase in the duty on blackstrap molasses intended for the distillation of alcohol.* The Broussard amendment will be strongly urged in the alleged interest of the farming community on the ground that it would compel the distillers to use corn instead of molasses in the production of alcohol. Such a substitution is wholly impracticable and even if it were possible it would involve the scrapping of many million dollars of alcohol plants and the removal of all distilleries from the seaboard to the corn-growing regions. Incidentally it would so increase the cost of alcohol as to make its use prohibitory for many purposes, including the manufacture of anti-freeze mixtures for automobiles."

REVISION OF LAWS ON NARCOTICS PLANNED.

Representative Porter, of Pittsburgh, Pa., Chairman of the House Committee on Foreign Affairs, conferred at the Department of Justice July 13th regarding details of a new proposed law covering narcotics which Mr. Porter is drafting for consideration by Congress. Mr. Porter stated that there are several problems involved in the drafting of such a law, including the rights of states in connection with the enforcement of narcotic laws.

Mr. Porter is also conferring with representatives of the Departments of State and Treasury.

One feature of the new measure, Representative Porter said, will be the separation of the work of enforcing the law regarding narcotics from the Bureau of Prohibition.

"It is a matter of sufficient importance now, this question of narcotics enforcement," he continued, "that it should no longer be a subordinate branch and should not be tied up with the enforcement of prohibition. It should be a separate and distinct bureau."

He said that the measure now in course of drafting is a revision of the narcotic laws to be introduced at the regular session of Congress. "I have been working on it," he said, "for two months with a view to making the narcotic laws of the country more efficient and to overcome difficulties that have developed during the last eight or ten years.

"I will have the bill ready for action by Congress when the House meets in December and the committees are organized for that regular session," he said.

The foregoing interview reported in the Press has interest for pharmacists, all of whom are desirous of aiding narcotic control, and always have; in fact, they have been leaders in such movements, and will doubtless, be consulted by Mr. Porter.

"PHARMACY" DESIGNATES STORE IN WHICH A REGISTERED PHARMACIST IS EMPLOYED.

The new Texas pharmacy law requires that the word "pharmacy" be displayed in or on the front of a drug store in which a registered pharmacist is regularly employed. It is unlawful to display the sign in which no registered pharmacist is regularly employed; towns of less than 500 population are exempted.

BOOK REVIEW.

Industrial Carbon. C. L. MANTELL, Ph.D., Pratt Institute. pp. vii + 410. D. Van Nostrand Co., Inc., N. Y., 1928. $4.50. One of the publishers' additions to their series of Industrial Chemical Monographs, edited by H. E. Howe.

The author has contributed a noteworthy addition to the technical literature on carbon and carbon products, having incorporated valuable data otherwise accessible only from diversified sources. Among the twenty-nine chapters devoted to the industrial uses, manufacture and specific applications of carbon, there is considerable material of practical value to the pharmaceutical chemist.

The writer, starting with the subject of Diamonds, continues down through Natural Graphites, Lubricating Graphites, Manufacture of Lampblack, Decolorizing Carbon, Pharmaceutical Charcoal, Carbon Specialties, Gas Absorbent Charcoal, etc., and concludes with a chapter on the making of "Lead" Pencils. Historical details are presented in an interesting manner and numerous halftones have been included.

The chapter dealing with Artificial Graphite contains several erroneous conclusions in view of recent X-ray researches concerning the physical constitution of graphite. The book as a whole well merits its position in the forthcoming Monographs on Industrial Chemistry.

SIMON MENDELSOHN.